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WAR DEPARTMENT.

MONTHLY WEATHER REVIEW.

(GENERAL WEATHER SERVICE OF THE UNITED STATES.)

OCTOBER, 1888.

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PREPARED UNDER THE DIRECTION OF
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1888.

List of merchant marine steam and sailing vessels from which International Meteorological reports were received at the Office of the Chief Signal Officer, U. S. Army, Washington, D. C., in time to be used in the preparation of the Weather Review for the month of October, 1888.

	Name of vessel.	Captain.		Name of vessel.	Captain.		Name of vessel.	Captain.
Br.	s. s. Adriatic	Capt. J. G. Cameron.	Br.	s. s. Grecian	Capt. C. E. Le Gallais.	Dtch.	s. s. Schiedam	Capt. K. Menhonides.
	Aguan	J. C. Adair.		Greece	A. J. Jeffrey.	Br.	Scythia	T. Roberts.
	Allan	J. W. Morris.		Gussie	Robert Staples.		Servia	H. McKay.
Am.	Alamo	S. Rich.	Ger.	Hammonia	C. Hebich.		Siberian	R. P. Moore.
Br.	Alaska	C. S. Murray.		Hanover	H. Gathemann.		Sidonian	B. Jamison.
	Alene	E. J. Selders.	Dan.	Hekla	A. G. Thomson.		Spain	W. A. Griffiths.
Ger.	Allemania	N. F. Schrader.	Ger.	Hermann	A. Kohlman.		State of Georgia	G. Moodie.
	Aller	H. Christoffers.	Br.	Herschel	G. Braithwaite.		State of Indiana	A. Ritchie
Br.	Alva	D. Williams.		Hibernian	John Brown.		State of Nebraska	A. G. Brace.
Ger.	America	R. Heintze.		Holland	Thos. Foote.		State of Nevada	J. A. Stewart.
Fr.	Amerique	W. Dardignac.	Ger.	Holsatia	C. Droescher.		State of Texas	Gilbert Williams.
Br.	Anchoria	W. Brown.	Br.	Hudson	H. R. Freeman.		Strabo	A. Matheson.
Am.	Andes	J. Evans.	Am.	Indiana	W. J. Boggs.		Straits of Gibraltar	Geo. Grigs.
Br.	Arizona	S. Brooks.	Br.	Iowa	E. W. Owens.	Ger.	Suevia	C. Ludwig.
	Ascania	F. Mettenthal.	Dan.	Island	W. Skjodt.	Belg.	Switzerland	J. Ueberweg.
	Athos	H. Low.	Br.	Istrian	A. W. Bell.	Br.	Tamar	J. W. Spooner.
	Aurania	W. H. P. Haine.		Italia	Thos. Craig.	Ger.	Taormina	G. W Koch.
	Australia	A. McRitchie.		Italy	W. Pearce.	Br.	The Queen	J. P. Heeley.
	Baltimore	J. Tremery.		Kansas	W. Gleig.	Ger.	Teutonia	P. Busch.
	Barracouta	R. E. Hubbard.		Kate Fawcett	W. F. Young.	Br.	Toronto	Jas. McAuley.
	Barrowmore	John Inch.	Ger.	Kehrwieder	H. Spleidt.	Ger.	Trave	W. Willegerod.
Ger.	Baumwall	C. W. Rehse.	Fr.	La Bourgogne	E. Frangeul.	Br.	Trinidad	W. J. Fraser.
Br.	Bavarian	M. Fitt.		La Bretagne	M. de'Jousselin.		Umbria	W. McMicken.
	Belair	Geo. Dunlop.		La Champagne	Buyer.		Vancouver	C. J. Lindall.
Belg.	Belgenland	W. A. Beynon.	Ger.	Lahn	H. Hellmers.		Venetian	E. Parry.
Fr.	Bengore Head	J. R. Brady.	Br.	Lake Huron	M. L. Tranmar.	Belg	Waesland	H. Buschmann.
Span.	Benito Estenger	E. F. Canal.		Lake Superior	Wm. Stewart.	Br.	Waldensian	A. Whyte.
Ger.	Berlin	A. von Collen.		Lake Winnipeg	P. D. Murray.		Wallachia	W. Crockery.
	Bohemia	E. Kopff.	Am.	Lampassas	M. B. Crowell.	Ger.	Wandrahm	F. Parath.
Br.	Bothnia	T. Datton.	Fr.	La Normandie	G. de Kersabiec.		Werra	R. Bussuis.
Ger.	Braunschweig	H. Bodeker.	Br.	Llandaff City	T. H. Gore.	Belg.	Westerniland	W. G. Randle.
Am.	Breakwater	R. B. Boas.		Lord Clive	F. Urquhart.	Ger.	Wieland	A. Albers.
Fr.	Britannia	J. Parasols.		Lord Gough	E. M. Hughes.	Br.	Wisconsin	J. P. Worral.
Br.	Britannic	H. Parsell.		Lord O'Neill	A. Ferris.		Wyoming	C. L. Rigby.
	British Prince	S. Nowell.	Am.	Lorenzo D. Baker	W. F. Wiley.	Dtch.	Zaandam	W. Ponson.
	British Princess	E. H. Freeth.		Louisiana	E. V. Gager.	Belg.	Zeeland	C. H. Grant.
	British Queen	R. Wills.	Br.	Lydian Monarch	T. C. Huggett.		*United States Naval.*	
	Brooklyn City	W. Fitt.		Madura	K. Doyle.	U. S. S. Albatross		Z. S. Tanner.
	Bulgarian	R. Leask.	Ger.	Main	A. Jaeger.	U. S. R. S. Dale		Yates Sterling.
Fr.	Burgundia	F. Dulac.	Br.	Maine	R. Griffiths.	U. S. S. Despatch		W. S. Cowles.
Ger.	California	O. Winkler.	Am.	Manhattan	Frank Stevens.	U. S. S. Dolphin		G. F. F. Wilde.
Br.	California	B. T. Garvie.	Br.	Manitoban	G. Dunlop.	U. S. S. Enterprise		B. H. McCalla.
	Canada	John Robinson.		Marsca	L. O. Moon.	U. S. S. Franklin		B. S. Richards.
	Capulet	W. H. Ellis.	Am.	Marmion	John H. Fisher	U. S. R. S. Independence		J. W. Philip.
	Caribbean	H. Daniel.	Br.	Maryland	A. H. Luckhurst.	U. S. S. Lancaster		T. F. Kane.
Am.	Carondelet	W. F. Evans.		Mentmore	R Boutcher.	U. S. S. Michigan		H. F. Picking.
Br.	Carroll	G. H. Brown.		Michigan	H. Bocquet.	U. S. S. Minnesota		G. C. Wiltse.
	Caspian	A. McDougall.		Michigan	S. Walters.	U. S. S. Monongahela		W. E. Gibson.
	Catalonia	J. J. Atkin.		Minnesota	R. J. Blacklin.	U. S. S. New Hampshire		F. J. Higginson.
Ger.	Catania	H. M. Franck.	Ger.	Moravia	Bahrends.	U. S. S. Omaipee		A. G. Kellogg.
Br.	Celtic	H. Davison.	Br.	Muriel	G. S. Locke.	U. S. S. Richmond		Louis Kingsley.
	Cephalonia	Henry Walker.	Belg.	Nederland	A. J. Griffin.	U. S. R. S. St. Louis		Wm. Whitehead.
Fr.	Chateau Lafitte	M. C. Ollivier.	Br.	Nestorian	John France.	U. S. S. Wabash		C. C. Carpenter.
Br.	Chester	S. Wohlmuth.		Nessmore	G. Elliott.	U. S. S. Yantic		O. F. Heyerman.
	Circassia	A. Campbell.	Fr.	Neustria	P. Verriers.		*Sailing vessels.*	
	Circassian	R. Barrett.	Am.	Newport	Chas. C. Lima.	Br.	bk. Abyssinian	H. Hughes.
Am.	City of Augusta	J. W. Catherine.		New York	Geo. Mason.	Am.	Alice	W. G. Kair.
Br.	City of Berlin	F. S. Land.	Belg.	Noordland	H. E. Nickels.		schr. Anna E. Kranz	F. H. Pervere.
	City of Chicago	A. W. Lewis.	Nor.	Norrona	J. J. Isakjen.		bg. Anna R. Stow	W. F. Adams.
Am.	City of Columbia	John McIntosh.	Br.	Norseman	R. Williams.		schr. City of Baltimore	L. S. Tawes.
	City of Dallas	C. W. Read.		Nova Scotian	R. H. Hughes.	Pilot boat	E. C. Knight	J. F. Springer.
Br.	City of Richmond	A. Bedford.	Am.	Nueces	Geo. Belger.	Am.	bg. Edith	W. G. Foster.
	City of Rome	H. Young.	Br.	Ohio	R. W. Sargent.		bk. Emma C. Knowles	F. Mayhew.
Am.	City of Washington	J. W. Reynolds.		Ohio	C. H. Holtum.	Nor.	Hanna	S. F. Muns.
Br.	Colina	R. C. Jennings.		Oranmore	B. Jones.	Am.	Hattie N. Bangs	F. S. Bangs.
	Colon	F. Henderson.		Oregon	H. C. Williams.		bg. H. B. Hussey	G. B. Hodgdon.
	Colonia	W. Bocke.		Orinoco	J. S. Garvin.	Ger.	sp. Hugo	J. Kuhlken.
Am.	Colorado	F. E. Jenkins.		Parisian	W. H. Smith.	Am.	schr. Humarock	J. P. Thatcher.
Br.	Concordia	A. McLean.		Pavonia	A. McKay.		bg. John C. Noyes	G. B. Hix.
	Corean	C. J. Menslee.		Pawnee	J. James.		schr. John C. Gregory	O. J. Bowers.
	Crown Prince	J. Scrivener.	Dtch.	P. Caland	A. Potjer.		bkt. John J. Marsh	F. P. Whittier.
	Denmark	R. S. Rigby.	Belg.	Pennland	Rud. Weyer.		bk. John R. Stanhope	J. B. Norton.
	Devonia	John Craig.	Br.	Peruvian	J. G. Stephen.		schr. J. R. Bergen	W. H. Squires.
Ger.	Donau	W. Topeer.	Am.	Philadelphia	Sam. Hess.	Por.	bk. Julius	F. D. Vieira.
Br.	Dorian	J. MacFarlane.	Br.	Phoenician	A. H. Vipond.	Am.	Kennard	J. H. Bettencourt.
	Earnmoor	R. Grey.	Ger.	Polaris	E. Scheuck.	Br.	Lady Lisgar	John Hughes.
	Earnwell	C. N. Mumford.		Polynesia	A. Kuhn.	Am.	sp. Light-ship No. 45	Andrew Jackson.
Dtch.	Edam	W. Bakker.	Br.	Pomeranian	H. Dalziel.		bg. L. F. Munson	J. V. McKowen.
Br.	Edith Godden	J. H. Bennett.		Pomona	J. Legoe.		bk. Lillian B. Jones	E. F. Petrie.
	Egypt	J. Sumner.		Ponca	W. Bowen.	It.	Madre	
Ger.	Elder	H. Baur.		Powhatan	John Jenkins.	Am.	bg. Mary Fink	D. B. Darrah.
	Elbe	R. Saunder.	Dtch.	Prinz Wilhelm	H. N. Prins.		schr. Maud H. Dudley	D. W. Oliver.
Am.	El Paso	H. S. Quick.	Br.	Prussian	J. Amberg.		bk. Meguntlcook	W. W. Hatch.
Ger.	Ems	Th. Jüngst.		Red Sea	C. Bakar.	Ger.	Nanny	C. A. H. Wilhemi.
Br.	England	A. F. Henley.		Rembrandt	N. Wac.	Am.	schr. Navarino	J. W Cole.
	Erin	Wm. Tynon.	Ger.	Rhaetia	H. Vogelgesang.	Br.	bk. Norman	W. Burnley.
	Ethiopia	John Wilson.		Rhein	W. Kuhlmann.	Ger.	Neptune	J. F. Hill.
	Etruria	T. Cook.	Belg.	Rhynland	J. C. Jamison.		Orpheus	G. Kronel.
Sp.	Euskaro	S. de Folleria.	Am.	Rio Grande	Jas. F. Lewis.	Am.	Pilgrim	John Freeman.
Br.	Exeter City	Thos. L. Weim.	Br.	Roman	E. Maddox.	Nor.	Qvos	G. Olsen.
Am.	Excelsior	H. L. Higgins.		Rosse	Thos. Henning.	Br.	Recovery	C. Davison.
Br.	Explorer	E. A. Brown.	Dtch.	Rotterdam	H. C. v. d. Zee.	Nor.	sp. Ruif	F. S. Forgenson.
	Fanita	J. C. Norton.	Br.	Roxburg Castle	A. Turpin.	Br.	bk. Salina	John Peterson.
	Federation	R. Pinkham.	Ger.	Rugia	R. Karlowa.		sp. Servia	E. M. Smith.
	France	A. D. Hadley.		Saale	H. Richter.	Ger.	Sophie	H. Hasenfuss.
Ger.	Fulda	R. Ringk.	Br.	Sacrobosa	Henry Gibb.	It.	bk. Teresa Accame	B. Geroleomo.
Br.	Furnessia	J. Hedderwick.		Samana	H. Bermpohle.	Am.	Thomas A. Goddard	Amasa C. Sears.
	Galileo	Wm. Magee.		Samaria	J. B. Watt.		Thomas Brooks	F. H. Johnson.
	Gallia	M. Murphy.		Santiago	R. Potter.		schr. Thomas P. Ball	H. B. Ryder.
Ger.	Gellert	W. Kuhlewein.		Sarmatian	W. Richardson.		sp. Trojan	M. Mosher.
Br.	Germanic	W. Roberts.		Sarnia	J. Gibson.	Br.	bk. Valona	H. Andrews.
	Glendale	W. Dickman.	Ger.	Savona	G. Kuchenthal.	Am.	schr. Winnie Lowry	A. McRitchie.
Ger.	Gluckauf	A. Buhner.		Saxonia	F. Renter.			
	Gothia	G. Franck.	Br.	Scandinavian	John Park.			

UNITED STATES SIGNAL SERVICE

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VOL. XVI. WASHINGTON CITY, OCTOBER, 1888. No. 10.

INTRODUCTION.

This REVIEW treats generally the meteorological conditions of the United States and Canada for October, 1888, and is based upon reports of regular and voluntary observers of both countries.

On chart i the paths of the centres of eighteen areas of low pressure are shown; the average number traced for October during the last fifteen years being 10.3.

The areas of high and low pressure are discussed under their respective headings. Descriptions of the storms that occurred over the north Atlantic Ocean are also given, and their approximate paths shown on chart i, on which also appear the distribution of icebergs and the limits of fog-belts west of the fortieth meridian.

The severest disturbances on the north Atlantic occurred off the middle Atlantic coast of the United States on the 11th, and over mid-ocean from the 25th to the 28th, when destructive gales attaining hurricane force were reported. There was a deficiency in the aggregate quantity of Arctic ice reported, and fog was less frequently observed than for the preceding month.

A noteworthy feature of the month was the remarkable storm which appeared on the south Pacific coast during the afternoon of the 17th, and moved eastward, reaching the Gulf of Mexico on the morning of the 21st. More rain fell at most of the stations along the route of this storm than had been previously noted during the whole month.

On chart ii the distribution of mean temperature for the month is shown by dotted isotherms. The month was cooler than the average October over a greater part of the country east of the one-hundredth meridian, the deficiencies in mean temperature being most marked from New England southwestward to Tennessee and on the middle Atlantic coast, where they were more than 6°. Over the western part of the country the mean temperature was generally above the normal, the greatest excesses occurring in the Sacramento Valley and over west Montana, where they exceeded 4°. At two stations in Washington Territory the maximum temperatures were the highest reported in October for a series of years.

Chart iii exhibits normal and current October temperature curves for selected stations.

The distribution of rainfall for October, 1888, is shown on chart iv, and the normal precipitation for eighteen years is exhibited on chart v.

In western New England, the Lake region, Florida, south of the thirtieth parallel, and over a greater part of the country west of the Mississippi River the rainfall was deficient, notably in the lower Missouri and Rio Grande valleys, where less than one-half the usual amount for October fell. In the Canadian Maritime Provinces, Maine, the middle Atlantic, south Atlantic, and east Gulf states, over the southern plateau and southern slope of the Rocky Mountains, and along the north Pacific coast it was in excess. Over a considerable part of California there was a total absence of rain. Noteworthy October rainfall data of a more local character are noted under the headings "Excessive Precipitation" and "Floods."

Commencing with July, 1888, the meteorological means for stations of the Signal Service have been determined from observations taken twice daily at 8 a. m. and 8 p. m. (75th meridian time). These hours of observation have been permanently adopted to supersede the former system of tri-daily observations taken at eight-hour intervals.

In the preparation of this REVIEW the following data, received to November 20, 1888, have been used: the regular semi-daily weather-charts, containing data of simultaneous observations taken at 133 Signal Service stations and 22 Canadian stations, as telegraphed to this office; 175 monthly journals and 175 monthly means from the former and 22 monthly means from the latter; 375 monthly registers from voluntary observers; 76 monthly registers from United States Army post surgeons; marine records; international simultaneous observations; marine reports through the co-operation of the Hydrographic Office, United States Navy, and the "New York Herald Weather Service;" monthly weather reports from the local weather services of Alabama, Arkansas, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Michigan, Minnesota, Mississippi, Missouri, Nebraska, Nevada, New England, New Jersey, New York, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, and Texas, and the Central Pacific Railway Company; trustworthy newspaper extracts, and special reports.

ATMOSPHERIC PRESSURE (expressed in inches and hundredths).

The distribution of mean atmospheric pressure for October, 1888, as determined from observations taken daily at 8 a. m. and 8 p. m. (75th meridian time), is shown on chart ii by isobars. On July 1, 1888, the tri-daily observations of the Signal Service were superseded by observations taken twice daily at the hours named. A protracted series of hourly observations has shown that the difference is almost inappreciable between the mean pressure obtained from two observations taken at these hours and that determined from tri-daily observations taken at eight-hour intervals.

The mean pressure for October, 1888, was highest over the south Atlantic states and western Oregon, where it rose to 30.08. The area of lowest mean pressure occupied the lower Colorado valley, where the values fell to 29.81 at Yuma, Ariz. In the lower Saint Lawrence valley and along the west coast of the Gulf of Saint Lawrence the mean readings were below 29.85, while in the Saskatchewan Valley they fell below 29.90.

As compared with the pressure chart for September, 1888, an increase is shown over the south Atlantic states south of the thirty-fifth parallel, and from thence westward to the ninety-

seventh meridian; along the Pacific coast south of the forty-seventh parallel, and over a greater part of the plateau region of the Rocky Mountains. The greatest increase has occurred over northern California and southern Florida, where it amounts to .10 and .07, respectively. From the Rio Grande Valley northward to the British Possessions, and over the entire eastern part of the country north of the thirty-fifth parallel, there has been a decrease in pressure, which becomes more marked eastward to the Canadian Maritime Provinces, where it amounts to .21.

As compared with the normal pressure for October, the mean barometer readings for the current month were below the normal, except over southern Florida and northern Nevada, where the departures above the normal were less than .03. The departures below the normal were most marked over Nova Scotia and New Brunswick, where they exceeded .20. From this locality southwestward to the Gulf of Mexico and westward to the middle plateau region of the Rocky Mountains the deficiencies become less marked; in California and Arizona they varied from .05 to .09, while over Oregon and Washington Territory they were less than .05.

BAROMETRIC RANGES.

The monthly barometric ranges at the various Signal Service stations are given in the table of miscellaneous meteorological data. The ranges conform to the general rule, that is they increase with the latitude and decrease slightly, though somewhat irregularly, with increasing longitude. Along the Atlantic coast the extreme ranges varied from .42 at Key West, Fla., to 1.43 at Eastport, Me.; between the eighty-second and ninety-second meridians, .50 at New Orleans, La., to 1.04 at Alpena, Mich.; between the Mississippi River and Rocky Mountains, .38 at Brownsville, Tex., to 1.03 at Poplar River, Mont.; in the plateau and Rocky Mountain regions, .38 at Fort Grant, Ariz., to .92 at Spokane Falls, Wash.; on the Pacific coast., .28 at Los Angeles and San Diego, Cal., to .74 at Olympia, Wash.

AREAS OF HIGH PRESSURE.

During October there were ten well-defined areas, five of which were first noted on the Pacific coast, three in Manitoba, and one in Arkansas. The general direction was east-southeast, and i, v, vi, vii, and ix passed off the southeast Atlantic coast and were merged in the permanent area of high pressure in the Saragossa Sea, that area having apparently moved slightly westward. This rather persistent trend of the high areas combined with the persistency of the low areas to the northeast accounts for the abnormal conditions over New England and the Atlantic coast. Only two areas, iii and viii, passed off to the northeast, and the remainder died out before reaching the Atlantic.

The following table exhibits, in a concise manner, some of the more prominent characteristics of the high areas:

No.	First observed.			Last observed.		Duration.	Velocity per h'r.	Highest pressure.		
	Date.	Lat. N.	Long. W.	Lat. N.	Long. W.			Date.	Station.	Reading.
		°	°	°	°	Days.	Miles.			Inches.
I	1	52	108	35	73	3.5	28	2	Saint Vincent, Minn.	30.36
II	4	53	101	32	96	5.0	15	6	North Platte, Nebr	30.32
III	7	51	91	51	63	5.0	18	9	Green Bay, Wis	30.16
IV	8	42	126	50	97	4.5	22	12	Rapid City, Dak	30.28
V	13	35	92	33	76	2.0	20	14	Mobile, Ala.	30.18
VI	13	46	124	31	76	6.0	23	18	Lynchburg, Va	30.38
VII	17	47	123	33	73	5.5	26	19	Cheyenne, Wyo	30.46
VIII	20	47	124	42	68	4.5	33	22	Roseburg, Oregon	30.46
IX	26	47	120	33	70	5.0	29	31	Norfolk, Va	30.46
X	30	47	119	50	95	1.5	40	31	Minnedosa, N. W. T.	30.14
							25.4		Mean	30.32

It is interesting to note that during October the mean of the several highest readings is 30.32, while in September the same mean was 30.46. The highest pressure during the month was 30.46, which is remarkably low for this month. In general most of the high areas were not as well-defined as usual for October. The mean velocity is slightly greater than in September. It should be noted that this velocity is often difficult to ascertain owing to an indefiniteness in the movement. This velocity is determined from the forward motion of the high area for each twelve hours, and it does not indicate the eastward velocity of the upper current in which the high area may be supposed to move, which must be much greater.

I.—This area was first noted on the morning of the 1st to the north of Montana. It moved rapidly to the southeast and passed off the south Atlantic coast on the 4th. Killing frosts occurred during its progress in the Ohio Valley morning of the 3d, and in Virginia morning of the 4th. During the progress of this and all other high areas the diurnal range of air pressure was very marked, ranging from .10 to .15 each twenty-four hours in the portions where the sky remained clear. During the passage of low areas this phenomenon was not noted, which was to be expected, owing to the cloudiness of the sky. It is suggested that this may lead to an additional method of investigating this peculiar phenomenon, which has never yet been satisfactorily explained.

II.—This area appeared in Manitoba on the 4th. It moved nearly due south to Texas, where it gradually died out on the 9th. It had the least rate of progress of any of the areas of the month.

III.—First noted to the north of Michigan; it moved southeast to Ohio, where it turned at right angles and moved up the Saint Lawrence Valley, disappearing on the 12th.

IV.—Appearing on the north Pacific coast on the 8th, it moved nearly east, and was lost sight of in Manitoba on the 13th.

V.—This area was an off-shoot of the last, first noted in Arkansas afternoon of the 13th. It moved due east, and passed off the Atlantic coast two days later.

VI.—This area was first noted off the north Pacific coast the afternoon of the 13th. Its track was a little south of east, passing off the south Atlantic coast the afternoon of the 18th.

VII.—This area, like the last, first appeared off the north Pacific coast. From the 17th to the 21st it moved nearly due east along the forty-fifth parallel to Lake Huron; it then turned abruptly nearly south, and on the next day passed off the middle Atlantic coast. The greatest falls in temperature for twenty-four hours occurred during the progress of this area, 30° at Cheyenne morning of the 19th, 30° at Fort Smith morning of the 20th, and 24° at Lynchburg afternoon of the 20th.

VIII.—This, like the last two, first appeared on the north Pacific coast. In three days it moved southeast to Texas, then turning east-northeast it moved off the coast of Nova Scotia on the 26th. Its motion, thirty-three miles per hour, was exceeded only by x.

IX.—First noted on the 26th in Washington Territory. This area moved southeast to Alabama, then nearly east, passing off the middle Atlantic coast on the 30th.

X.—This area was first noted in Washington Territory on the 30th, and moved very rapidly (forty miles per hour) due east, being in Manitoba on the last day of the month.

AREAS OF LOW PRESSURE.

There were eighteen areas of low pressure sufficiently marked, within the area of observation, to be traced. The general trend of these will be found on chart i, accompanying this REVIEW; iv, xi, xiv, xvi, and xviii were too far north to have the velocity determined.

Their velocity seemed to have a maximum about the 3d, a minimum near the 13th, and another maximum on the 21st. The average velocity was 25.4 miles per hour, which was exactly the same as that of the high areas. All storms traced for more than one day east of the ninety-second meridian moved toward the northeast or east, and these paths converged over the Saint Lawrence Valley. As previously noted the persistency of the high areas to the east of the south Atlantic states,

together with an apparent westward movement of the permanent area of low pressure in Smith's Sound, dominated the weather in the New England and middle Atlantic states.

The following table exhibits the principal facts regarding these low areas. The heading of each column shows to what the figures refer:

No.	First observed.			Last observed.		Duration.	Velocity per h'r.	Lowest pressure.		
	Date.	Lat. N.	Long. W.	Lat. N.	Long. W.			Date.	Station.	Reading.
		°	°	°	°	*Days.*	*Miles.*			*Inches.*
I.....	1	44	84	50	64	3.0	24	3	Chattanooga, Tenn.....	29.28
II.....	2	50	112	47	71	2.5	32	3	Winnipeg, Manitoba....	29.60
III.....	3	36	104	49	66	6.5	22	8	Chatham, N. B.....	28.90
IV.....	7	52	112	53	95	3.0	.....	8	Medicine Hat, N. W. T.	29.54
V.....	10	29	84	42	70	2.0	21	11	Charleston, S. C.....	29.36
VI.....	12	49	123	47	60	7.0	22	18	Bird Rocks, G. of St. L.	29.32
VII.....	12	41	84	42	69	2.0	17	12	Toledo, Ohio.....	29.60
VIII....	13	41	105	38	92	1.5	31	13	Denver, Colo.....	29.78
IX.....	17	42	114	48	66	4.0	28	19	Marquette, Mich.....	29.52
X.....	17	49	114	48	87	2.0	28	18	Minnedosa, N. W. T....	29.68
XI.....	19	50	127	53	107	1.5	.....	19	Calgarry, N. W. T.....	29.70
XII.....	20	35	108	45	62	2.5	31	24	Sydney, C. B. I.....	29.62
XIII....	23	50	117	50	92	2.0	23	23	Calgarry, N. W. T.....	29.26
XIV....	24	28	89	32	87	2.0	.....	25	Port Eads, La.....	29.84
XV.....	25	37	102	48	63	4.5	24	29	Chatham, N. B.....	28.86
XVI....	27	51	125	54	108	1.0	.....	27	Edmonton, N. W. T....	29.67
XVII...	28	48	113	50	72	3.0	27	30	Minnedosa, N. W. T....	29.52
XVIII..	31	42	113	43	109	0.5	.....	31	Salt Lake City, Utah...	29.66
							25.4		Mean.....	29.41

The following is a description of some of the characteristics of these low areas:

I.—This was the continuation of ix of the last month noted over Lake Superior on the 30th. Its motion was nearly due east passing to the Saint Lawrence Valley on the 4th. Destructive storms occurred in Ohio and Georgia to the south and southeast of this storm on the 2d. The wind reached sixty miles per hour at Montreal on the morning of the 4th. As often noted before the precipitation in this and nearly all storms of the month was exceedingly irregular. For example; .15 inch at Sandusky; .03 at Parkersburg; .12 at Block Island; 1.64 at Erie; 1.50 at Buffalo, and 1.30 at Albany. It has generally been supposed that heavy local precipitation occurred almost exclusively in connection with thunder and other violent local storms in the summer, but here we have the same effect when there were no local storms. It would seem as though, after the pressure, the precipitation must give us a better idea of the forces acting at the seat of the storm and a study of its distribution and occurrence cannot fail to shed light upon many intricate problems.

II.—This low area was first noted on the 1st just north of Montana; its path just crossed within the boundary of Dakota on the 3d, and its last position was, on the 5th, in the upper Saint Lawrence valley.

III.—First noted in New Mexico on the 3d; its track was nearly northeast, disappearing in the upper Saint Lawrence valley on the 10th. In connection with this storm occurred the waterspout on the 7th, as noted elsewhere. In this storm .10 inch rain fell at Davenport, .26 at Block Island, .43 at Rochester, 2.96 at Kansas City, 1.98 at Fort Smith, 1.88 at New York City, 1.86 at Albany, 1.20 at Boston, 2.18 at Portland, and 3.26 at Eastport; these later-named comprise all the stations at which more than one inch fell.

IV.—This low area originated to the north of Montana on the 7th. Its path was entirely to the north of the boundary, and was last noted in Manitoba on the 10th.

V.—This storm was first noted on the 10th in the eastern Gulf; its motion was northeast, and it was last definitely located, by land observations, off the Massachusetts coast on the 13th.

VI.—This storm was first noted off the north Pacific coast on the 11th. Its motion was nearly due east, being last noted near Newfoundland on the 19th. The heaviest rainfalls during its progress were .72 at Cairo, .66 at Buffalo, and .84 at Parkersburg.

VII.—This storm was first observed in Ohio on the 12th. It slowly moved eastward, being last observed on the 14th off the Massachusetts coast. On the 14th a waterspout occurred to the southeast of the low centre.

VIII.—First noted in Colorado on the 13th; this disturbance moved rapidly in a path curving slightly to the southward, and gradually filled up on the 15th in Missouri.

IX.—This storm apparently had its origin near northern Nevada on the 17th. Its motion was a little north of east, and it was last noted in the upper Saint Lawrence valley on the 21st. During this storm .18 inch rain fell at Des Moines, .36 at Milwaukee and Keokuk, while 2.10 fell at Davenport, 1.92 at Indianapolis, and only .14 at Louisville. Severe local storms occurred in connection with this storm on the 19th in Maryland and New York.

X.—This disturbance first appeared north of Montana on the 17th. Its motion was a little south of east, and it was merged in ix over Lake Superior on the 19th.

XI.—This was first noted off the north Pacific coast on the 19th. Its motion was to the eastward, and it was last noted in Manitoba on the 20th, its path having been above the boundary.

XII.—In many respects this was the most interesting storm of the month. For several days previous to the 20th there were experienced unusual clouded skies and rainfall in southern California and western Arizona. While the rainfall on the immediate south Pacific coast was slight, .32 at Los Angeles and .25 at San Diego, yet the heaviest fall in October since the beginning of observations was noted at interior stations, 1.75 at Prescott, 1.09 at Yuma, 1.56 at Stanton, &c. At many of the stations the single fall in this storm exceeded all previous total falls for October. The disturbance reached Texas on the 22d; 3.92 rain fell at Galveston. The rainfall at New Orleans was also very heavy in the twelve hours ending the afternoon of the 22d, 3.74 fell, while only .33 fell at Port Eads. While a portion of this storm moved to the northeast, disappearing near Newfoundland on the 25th, a disturbance, an off-shoot, still remained in the western Gulf, which was xiv, as described below.

XIII.—This low area was first noted to the north of Idaho on the 23d. Its path was nearly due east, it gradually dying out near Lake Superior on the 25th.

XIV.—This disturbance was a portion of xii, which remained in the Gulf. Its path was traced a very short distance, as it gradually died out in Alabama on the 26th. It is probable that the water-spout of the 25th was a secondary effect of this storm.

XV.—On the 25th this disturbance appeared to develop gradually in Kansas. The motion was northeastward, and it disappeared near Newfoundland on the 29th. The lowest pressure of the month, 28.86, occurred at Chatham during the progress of this storm on the 29th.

XVI.—This disturbance was noted to the north of Washington Territory on the 27th. Its path was above the boundary, and it was last noted on the 28th in Manitoba.

XVII.—This storm was first seen in Montana on the 28th. Its path was due east, and on the last day of the month it had reached the Province of Quebec.

XVIII.—This storm originated in Idaho on the 31st, and was traced to Wyoming on the afternoon of the same day.

NORTH ATLANTIC STORMS FOR OCTOBER, 1888 (pressure in inches and millimetres; wind-force by Beaufort scale).

The paths of the depressions that appeared over the north Atlantic Ocean during October, 1888, are shown on chart i. These paths have been determined from international simultaneous observations by captains of ocean steamships and sailing vessels, received through the co-operation of the Hydrographic Office, Navy Department, and the "New York Herald Weather Service."

Eleven depressions have been traced, of which six advanced

northeastward over or near Newfoundland; one first appeared over the ocean between the Azores and Portugal; two apparently developed east of the Banks of Newfoundland, and two moved eastward from the American coast near the fortieth parallel. The storms generally followed normal east to northeast tracks in the vicinity of the American coast, while over mid-ocean they, in instances, pursued irregular paths. On the 10th a depression appeared over the eastern part of the Gulf of Mexico, from whence it is traced northeastward along the coast as land low area v. This depression attained great energy during the 11th, when it occasioned gales of hurricane force off the middle Atlantic coast of the United States.

The severest disturbances of the month occurred over mid-ocean east of the thirty-fifth meridian from the 25th to the 28th, inclusive, attending depressions numbers 7 and 8, whose tracks converged, and apparently united on the 25th.

In October, 1887, sixteen depressions were traced, of which eight were of tropical or sub-tropical origin; four advanced eastward over Newfoundland, one of which traversed the ocean from coast to coast; three moved northeastward from the middle Atlantic coast of the United States; one first appeared over the ocean northeast of Newfoundland, and one was located west of the British Isles on the last day of the month. The severest weather was experienced in the vicinlty of the British Isles during the last five days of the month.

In October, 1888, there was a marked deficiency in the number of depressions traced when compared with those charted for the corresponding month of previous years. Over the western part of the ocean generally unsettled weather prevailed, while in the vicinity of the British Isles the early part of the first and the latter half of the third decade were the only periods during which storms of marked violence were reported.

In the following descriptions of the depressions traced positions are given in degrees of latitude and longitude, except in cases where from twenty-five to thirty-five minutes have been cited, when they are given in degrees and half degrees:

1.—This depression was central on the 1st between Cape Breton Island and Newfoundland, from whence it moved northeastward and disappeared north of the fiftieth parallel. On the afternoon of the 1st strong sse. gales, veering to s., wsw., and nw. by w., and pressure falling to 29.40 (747), were reported south of Newfoundland.

2.—This depression was central about seven degrees east-northeast from the Azores on the 1st, from which position it advanced over the Bay of Biscay by the 2d, and subsequently disappeared over the continent of Europe, attended by fresh to strong gales, and pressure falling below 29.30 (744).

3.—This depression (low area i) passed eastward from the New England coast during the 3d, and by the 4th had moved northeast over the Gulf of Saint Lawrence, after which it advanced north-northeast beyond the region of observation. During these dates fresh to strong gales were reported off the coast of the United States to the thirty-fifth parallel.

4.—This depression (low area iii) was central off the western extremity of Nova Scotia on the 8th, from whence it advanced over the Gulf of Saint Lawrence by the 9th. During the next three days the storm-centre moved slowly eastward to the forty-fifth meridian, after which it recurved to the northwest, and, after the 14th, passed northeastward to the thirtieth meridian, where it disappeared after the 17th. During the 8th and 9th strong to whole se. to sw. gales prevailed south of Newfoundland and Nova Scotia, with barometric pressure falling below 29.20 (742), and on the 15th and 16th the depression was attended by strong to whole gales and pressure below 29.00 (737).

5.—This depression was a continuation of land low area v, which moved northeastward along the Atlantic coast of the United States, attended during the 11th and 12th by destructive hurricanes over the adjacent ocean. On the 14th the storm was central in about N. 40°, W. 67° 30′, from which position it moved east to the sixtieth meridian by the 15th. By noon, Greenwich time, of the 16th the centre had moved east-northeast over the Banks of Newfoundland, and during the following three days advanced slowly north of east and disappeared east of the twentieth meridian after the 19th. This depression possessed moderate energy during its passage over the ocean.

6.—This was a depression (low area vi) of moderate energy which passed from the vicinity of Prince Edward Island north-northeast over the Gulf of Saint Lawrence and Newfoundland during the 18th and 19th, and subsequently disappeared north of the region of observation.

7-8.—This depression is first charted in N. 44°, W. 42°, under date of the 20th, and from this date until the close of the month it pursued a slow, irregular northeast course, and passed to the northward of the British Isles. On the 25th this storm apparently united with a depression (number 8) which had moved from off the western extremity of Nova Scotia, where it was central on the 20th north-northeastward over Newfoundland and eastward over the ocean to the twenty-fourth meridian. The progress of the depression after the 24th was marked by pressure ranging below 29.00 (737) and storms of great violence.

9.—This storm (low area xii) was central on the south New England coast on the 24th, from whence it moved rapidly eastward over the ocean. The movement of the storm-centre was indicated by storm reports of shipmasters, which show that gales of hurricane force were encountered in the trans-Atlantic tracks west of the sixtieth meridian during the 24th and 25th, and that the centre crossed this meridian between the fortieth and forty-fifth parallels. Although reports will not admit of accurately locating the storm-centre after the 24th the rapidity of its advance would seem to warrant the belief that depression number 10 was its continuation.

10.—This depression was central on the 25th in N. 45°, W. 38°, with pressure below 29.30 (744), and fresh to strong gales over a considerable area. By the 26th the centre of disturbance had apparently moved east-northeast and united with depression number 7–8.

11.—This depression (low area xv) moved northeast over the Gulf of Saint Lawrenee and Newfoundland during the 29th and 30th, and, after the latter date, disappeared north of the region of observation. On the dates referred to strong to whole gales and barometric pressure falling below 29.50 (749) were reported to the southward of Newfoundland and Nova Scotia.

OCEAN ICE.

The following table shows the southern and eastern limits of the region within which icebergs or field-ice were reported for October during the last six years:

Southern limit.			Eastern limit.		
Month.	Lat. N.	Long. W.	Month.	Lat. N.	Long. W.
	° ′	° ′		° ′	° ′
October, 1883	46 56	46 22	October, 1883	46 56	46 22
October, 1884	Off Cape	Race	October, 1884	46 56	50 55
October, 1885	48 21	47 12	October, 1885	48 21	47 12
October, 1886	41 34	49 43	October, 1886	46 3	46 37
October, 1887	42 58	50 2	October, 1887	42 58	50 2
October, 1888	51 43	55 36	October, 1888	51 43	55 36

On chart i the positions of icebergs reported during October, 1888, are shown by ruled shading. Ice was reported on two dates only. On the 20th the s. s. "Lake Superior" passed one large berg two miles east of Belle Isle; on the same day the s. s. "Lake Huron" passed a large berg two miles south of Belle Isle. On the 23d the s. s. "Glendale" passed a berg in N, 51° 43′, W. 55° 36′.

In October, 1887, icebergs were reported on three dates; on the 15th, one very large berg in N. 42° 58′, W. 50° 2′; on the 29th, two large bergs and small pieces of ice in N. 52° 5′, W. 54°; and on the 31st, two large bergs, one in N. 51° 50′, W. 54° 23′, and the other in N. 52° 6′, W. 54° 8′.

In September, 1888, ice was reported south of the fiftieth parallel on two dates only. In the Straits of Belle Isle and

off the extreme northern coast of Newfoundland icebergs were observed on ten dates.

Compared with ice reported for October during the five preceding years a deficiency is shown for October, 1888. The southernmost ice was about six and one-half degrees north of the average southern limit, and the easternmost ice was about seven and one-half degrees west of the average eastern limit.

FOG.

The limits of fog-belts to the westward of the fortieth meridian are shown on chart i by dotted shading. In the vicinity of the Banks of Newfoundland fog was reported on eleven days as compared with sixteen days for September, 1888, and fourteen days for October, 1887. Between the fifty-fifth and sixty-fifth meridians fog was reported for a total of two days as compared with eleven days for September, 1888, and two days for October, 1887. To the westward of the sixty-fifth meridian fog was reported on five days as compared with eleven days for September, 1888, and four days for October, 1887.

As compared with September, 1888, the southern limit of the Newfoundland fog-belt has extended about one degree, while in the vicinity of the American coast fog was reported about three degrees further south than in the preceding month.

In the several instances in which fog was reported over or near the Banks of Newfoundland the presence or passage of a centre of low barometric pressure was noted to the northward or westward. On the two dates for which fog was encountered south of Nova Scotia a storm-centre was passing eastward over Nova Scotia. The development of fog off the coast of the United States was generally attended by relatively high barometric pressure and variable winds, following the passage of areas of low pressure to the northward.

The following are limits of fog-areas on the north Atlantic Ocean during October, 1888, as reported by shipmasters:

Date.	Entered.		Cleared.		Date.	Entered.		Cleared.	
	Lat. N.	Lon. W.	Lat. N.	Lon. W.		Lat. N.	Lon. W.	Lat. N.	Lon. W.
	° ′	° ′	° ′	° ′		° ′	° ′	° ′	° ′
1	47 00	46 00	46 00	49 00	18	45 00	59 30	45 25	58 01
3-4	48 00	45 00	46 00	51 00	19	46 18	47 47	46 02	48 40
4	54 17	44 48	54 10	45 20	20	46 53	47 59	46 47	48 12
5	At St. Johns, N.F.				21	45 17	49 07	46 08	46 17
8	43 00	61 40	42 30	63 04	23-24	New York.		39 50	73 40
8	41 02	66 48	41 08	67 05	24	36 30	74 40	36 50	74 37
8	46 44	47 05	45 51	50 09	27-28	35 20	75 15	37 57	75 00
9-10	44 00	51 20	46 16	44 32	28	40 30	72 00	Off Sandy Hook.	
9-10	48 22	48 42	47 26	52 28	28-29	Boston.		40 30	69 00
9-10	42 42	47 50	42 50	51 00	.....	.....	.....	.....	.....
10	42 36	50 05	43 10	48 00	.....	.....	.....	.....	.....
10-11	45 03	51 33	45 52	45 52	.....	.....	.....	.....	.....
12	49 24	43 10	49 09	44 27	.....	.....	.....	.....	.....

TEMPERATURE OF THE AIR (expressed in degrees, Fahrenheit).

The distribution of mean temperature over the United States and Canada for October, 1888, is exhibited on chart ii by dotted isotherms. In the table of miscellaneous meteorological data the monthly mean temperatures and the departures from the normal are given for stations of the Signal Service. The figures opposite the names of the geographical districts in the columns for mean temperature show the averages for the several districts. The normal for any district may be found by adding the departure to the current mean when the departure is below the normal and subtracting when above. Chart iii exhibits normal and current October temperature curves for selected stations.

The mean temperature was highest over southern Florida, where a reading of 79°.1 was reported at Key West. Values rising above 70° were also reported along the west coast of the Gulf of Mexico and in the lower Colorado valley. In the Sacramento and San Joaquin valleys the readings rose above 65°. The lowest mean temperatures occurred in northern Ontario, Canada, where they fell to 38°.4 at Rockliffe, and over the lower Saint Lawrence valley, Lake Superior, northern Minnesota, Dakota, and Manitoba, where they ranged below 40°.

The mean temperature corresponded with the normal over portions of New Brunswick, Nova Scotia, southeastern Texas, and New Mexico, and along a line traced from the northern boundary of Dakota and Montana southward and southeastward to the Gulf of Mexico between Galveston, Tex., and New Orleans, La. Over a greater part of the country east of the one-hundredth meridian the mean temperature was below the normal, the deficiencies being most marked from New Hampshire southwestward to eastern Tennessee, and along the Atlantic coast between the thirty-eighth and fortieth parallels, where they exceeded 6°. To the westward of the one-hundredth meridian the temperature was generally above the normal, the greatest excesses occurring in the middle Sacramento valley and over western Montana, where they exceeded 4°.

The following are some of the most marked departures from the normal at the older established Signal Service stations:

Above normal.	°	Below normal.	°
Sacramento, Cal	4.2	Rochester, N. Y	6.8
Helena, Mont	4.2	Atlantic City, N. J	6.8
Fort Assinaboine, Mont	4.0	Albany, N. Y	6.4
Olympia, Wash	3.8	Columbus, Ohio	6.3
San Diego, Cal	3.8	Knoxville, Tenn	6.3

DEVIATIONS FROM NORMAL TEMPERATURES.

The following table shows for certain stations, as reported by voluntary observers, (1) the normal temperature for a series of years; (2) the length of record during which the observations have been taken, and from which the normal has been computed; (3) the mean temperature for October, 1888; (4) the departure of the current month from the normal; (5) and the extreme monthly means for October during the period of observation and the years of occurrence:

State and Station.	County.	(1) Normal for the month of Oct.	(2) Length of record.	(3) Mean for Oct., 1888.	(4) Departure from normal.	(5) Extreme monthly mean temperature for October.			
						Highest.		Lowest.	
						Am't.	Year.	Am't.	Year.
		°	Years	°	°	°		°	
Arkansas.									
Lead Hill	Boone	60.7	7	56.9	−3.8	65.6	1881	56.0	1885
California.									
Sacramento	Sacramento	60.4	22	57.6	−2.8	67.2	1875	54.7	1873
Connecticut									
Southington	Hartford	51.0	19	45.3	−5.7	56.1	1879	45.3	1888
Florida.									
Merritt's Island	Brevard	74.9	5	75.5	+0.6	76.2	1884	73.1	1885
Illinois.									
Aurora	Kane	51.0	10	47.4	−3.6	.....	.....	.....	.....
Golconda	Pope	60.8	11	55.6	−5.2	.....	.....	.....	.....
Greenville	Bond	57.7	10	51.5	−6.2	.....	.....	.....	.....
Peoria	Peoria	54.0	33	51.3	−2.7	62.7	1879	45.0	1869
Riley	McHenry	47.3	28	45.4	−1.9	.....	.....	.....	.....
Sandwich	De Kalb	51.5	36	51.0	−0.5	.....	.....	.....	.....
Indiana.									
Blue Lick	Clark	58.0	11	51.2	−6.8	.....	.....	.....	.....
Spiceland	Henry	51.2	34	48.7	−2.5	.....	.....	.....	.....
Vevay	Switzerland	56.2	22	51.7	−4.5	65.0	1879	46.5	1869
Iowa.									
Cresco	Howard	46.2	16	44.1	−2.1	.....	.....	.....	.....
Independence	Buchanan	48.0	13	46.0	−2.0	56.0	1879	45.0	1876
Monticello	Jones	49.5	35	46.2	−3.3	58.0	1879	36.0	1873
Kansas.									
Independence	Montgomery	58.2	17	56.5	−1.7	63.0	1881	52.2	1872
Lawrence	Douglas	54.4	21	53.0	−1.4	60.5	1879	44.0	1869
Yates Centre	Woodson	54.8	8	53.4	−1.4	58.8	1884	50.4	1885
Louisiana.									
Point Pleasant	Tensas	65.2	8	63.6	−1.6	.....	.....	.....	.....
Maine.									
Gardiner	Kennebec	47.2	52	42.9	−4.3	52.5	1879	42.8	1859
Maryland.									
Cumberland	Allegany	53.3	17	48.0	−5.3	60.0	1881	48.0	1888
Massachusetts.									
Somerset	Bristol	53.3	18	48.8	−4.5	.....	.....	.....	.....
Taunton	....do	53.1	17	46.8	−6.3	.....	.....	.....	.....
Michigan.									
Adrian	Lenawee	50.1	11	45.6	−4.5	.....	.....	.....	.....
Kalamazoo	Kalamazoo	50.6	13	47.4	−3.2	.....	.....	.....	.....
Thornville	Lapeer	51.4	12	45.9	−5.5	.....	.....	.....	.....
New Jersey.									
South Orange	Essex	53.2	19	47.6	−5.6	.....	.....	47.6	1888

Deviations from normal temperatures—Continued.

State and Station.	County.	(1) Normal for the month of Oct.	(2) Length of record.	(3) Mean for Oct., 1888.	(4) Departure from normal.	(5) Extreme monthly mean temperature for October.			
						Highest.		Lowest.	
						Am't.	Year.	Am't.	Year.
New Jersey.									
Moorestown	Burlington	53.5	25	48.6	−4.9	59.5	1879	48.7	1869
New York.									
Palermo	Oswego	46.9	35	43.9	−3.0	53.9	1879	39.3	1873
Ohio.									
Wauseon	Fulton	51.0	18	46.0	−5.0	59.0	1879	46.0	1875'88
Oregon.									
Albany	Linn	51.1	10	54.9	+3.8	56.3	1885	46.0	1881
Pennsylvania.									
Dyberry	Wayne	44.3	21	41.3	−3.0	53.9	1879	41.3	1888
Grampian Hills	Clearfield	48.0	25	43.4	−4.6	56.4	1879	39.2	1869
Wellsborough	Tioga	53.1	13	46.6	−6.5	67.2	1875	44.3	1877
South Carolina.									
Statesburgh	Sumter	64.0	8	59.8	−4.2	69.0	1881	59.8	1885'88
Tennessee.									
Milan	Gibson	58.2	6	56.1	−2.1	76.0	1884	45.0	1885
Texas.									
New Ulm	Austin	69.8	17	69.9	+0.1	73.9	1881	63.8	1873
Vermont.									
Strafford	Orange	47.3	14	40.6	−6.7	52.8	1879	40.6	1888
Virginia.									
Bird's Nest	Northampt'n	61.9	19	55.4	−6.5	69.2	1881	53.9	1886
Wytheville	Wythe	53.3	24	46.3	−7.0	59.0	1879	46.3	1888
West Virginia.									
Helvetia	Randolph	51.7	12	43.4	−6.3	56.8	1881	45.4	1888

The highest temperatures for the month were reported in southern Arizona, where a reading of 105°.1 was registered at Yuma. Values above 90° were recorded in the Sacramento and San Joaquin valleys, and in central and southeastern Texas. At Los Angeles, Cal., a maximum of 98° was attained. Excessive maximum temperatures were reported at two stations only, Olympia and Spokane Falls, Wash., where the readings were higher than for any preceding October during the last twelve and eight years, respectively, by 1° at the former and 4°.5 at the latter station. At stations in New England, on Lake Superior, and in the upper Missouri valley the highest temperatures for the month fell below the maximum values of the corresponding month of previous years by more than 20°.

The lowest temperatures occurred in the upper Missouri valley, where they fell to 16°.2 at Fort Assinaboine, Mont.; they were generally below 20° in Dakota, eastern Montana, and along the northern slope of the Rocky Mountains, while over the middle plateau region they fell below 25°. Unusually low temperatures were not reported, and over a greater part of the country, notably in the central valleys and along the eastern slope of the Rocky Mountains, the lowest temperatures were from 10° to 25° above the lowest readings of the corresponding month of previous years.

Table of comparative maximum and minimum temperatures for October.

State or Territory.	Stations.	For 1888.		Since establishment of station.				Length of record.
		Max.	Min.	Max.	Year.	Min.	Year.	
		°	°	°		°		Yrs.
Alabama	Mobile	86.0	48.0	93.4	1884	34.0	1873, 1887	18
Do	Montgomery	84.3	43.0	90.1	1884	32.0	1887	17
Arizona	Whipple B'ks	84.5	29.0	96.0	1881	18.0	1880	13
Do	Fort Apache	86.7	30.2	88.0	1887	19.0	1880	10
Arkansas	Fort Smith	84.5	34.0	94.6	1884	31.0	1886	7
Do	Little Rock	82.5	37.0	90.0	1881, 83, 84	33.1	1886, 1887	10
California	San Francisco	86.8	49.5	87.0	1887	45.0	1881	18
Do	San Diego	80.0	53.0	92.0	1879	44.0	1878	17
Colorado	Denver	79.8	28.0	96.0	1873	1.0	1873	17
Do	Montrose	78.0	25.3	83.0	1887	19.0	1885	4
Connecticut	New Haven	66.2	29.6	86.0	1881	24.0	1879	16
Do	New London	65.2	36.2	84.7	1879	27.2	1883	17
Dakota	Fort Buford	75.8	21.8	95.0	1879	0.3	1887	10
Do	Yankton	81.8	23.5	89.0	1879	9.0	1878	16
Dis. of Columbia	WashingtonCity	75.0	35.2	92.3	1881	26.0	1873	18
Florida	Jacksonville	86.0	49.9	92.0	1883	40.0	1873, 1887	18
Do	Key West	85.4	65.6	92.0	1876	65.0	1873, 1876	18
Georgia	Atlanta	79.2	40.5	90.8	1884	30.1	1887	11
Do	Savannah	82.3	49.0	92.0	1884	37.0	1873	18
Idaho	Boise City	82.0	24.8	87.4	1887	16.4	1887	12
Illinois	Cairo	80.1	36.5	88.0	1872, 1884	24.0	1873	17
Do	Chicago	76.3	31.5	84.0	1879	14.2	1887	17
Indiana	Indianapolis	78.4	32.0	87.0	1884	22.3	1887	16
Indian Ter	Fort Sill	87.5	33.0	91.0	1878, 1884	25.0	1878	11
Iowa	Dubuque	77.3	28.3	86.0	1879	14.6	1887	16
Do	Des Moines	79.0	27.8	85.8	1884	13.8	1887	11
Kansas	Dodge City	84.8	30.4	92.4	1887	10.0	1878	15
Do	Leavenworth	85.8	32.1	89.3	1887	19.0	1873	18

Table of comparative maximum and minimum temperatures, &c.—Cont'd.

State or Territory.	Stations.	For 1888.		Since establishment of station.				Length of record.
		Max.	Min.	Max.	Year.	Min.	Year.	
		°	°	°		°		Yrs.
Kentucky	Louisville	77.4	32.5	90.0	1884	25.5	1887	17
Louisiana	New Orleans	87.0	54.7	90.0	1884	40.0	1873	18
Do	Shreveport	87.4	43.5	95.0	1883	31.0	1873	16
Maine	Eastport	62.3	31.0	80.0	1879	34.0	1881	16
Do	Portland	61.0	36.8	83.0	1881	27.6	1886	17
Maryland	Baltimore	73.8	36.0	89.0	1879, 1881	30.0	1873, 76, 79	17
Massachusetts	Boston	69.0	33.8	90.0	1881	25.0	1879	18
Michigan	Marquette	65.9	29.1	87.0	1879	12.5	1887	15
Do	Grand Haven	64.0	29.5	80.0	1879	20.2	1887	16
Minnesota	Saint Vincent	76.0	19.0	81.6	1886	−10.3	1887	9
Do	Saint Paul	75.4	27.7	87.0	1879	11.5	1887	17
Mississippi	Vicksburg	85.3	44.0	93.7	1884	33.5	1887	17
Missouri	Saint Louis	85.2	36.0	90.0	1879	24.0	1887	18
Montana	Ft. Assinaboine	79.0	16.2	83.0	1884, 1885	−16.0	1881	9
Do	Helena	75.0	21.0	76.9	1885	2.7	1887	9
Nebraska	North Platte	80.0	19.8	89.0	1879	9.1	1887	15
Do	Omaha	80.2	28.2	87.0	1879	15.0	1878	16
Nevada	Winnemucca	79.5	20.8	87.0	1887	10.0	1878	10
New Jersey	Atlantic City	71.0	30.0	83.0	1884	29.0	1879	15
New Mexico	Santa Fé	72.3	29.5	85.0	1878	10.0	1880	15
New York	Buffalo	66.2	30.8	83.0	1879	24.4	1887	16
Do	New York City	68.7	34.9	88.3	1881	31.0	1876	18
North Carolina	Charlotte	78.0	37.0	91.9	1884	30.0	1879	10
Do	Wilmington	79.2	44.7	92.5	1884	32.0	1876	18
Ohio	Cincinnati	79.2	33.9	87.7	1884	26.1	1887	18
Do	Sandusky	76.0	32.7	87.0	1879	24.0	1887	12
Oregon	Portland	81.5	37.0	82.2	1885	31.0	1877	16
Do	Roseburg	82.8	32.6	90.9	1885	22.5	1881	12
Pennsylvania	Pittsburgh	73.8	32.7	91.1	1884	20.0	1887	16
Do	Philadelphia	69.5	34.8	87.0	1879, 1881	30.6	1887	18
Rhode Island	Block Island	62.3	34.1	75.4	1881	32.6	1884	9
South Carolina	Charleston	81.1	50.2	93.0	1883	39.0	1873	16
Tennessee	Knoxville	78.1	35.6	94.0	1884	25.0	1876	18
Do	Memphis	82.6	40.0	92.0	1879, 1884	29.0	1878	16
Texas	Brownsville	88.0	52.0	95.0	1877	49.0	1879	12
Do	Fort Elliott	87.7	34.2	89.3	1887	25.3	1887	9
Utah	Salt Lake City	78.2	31.5	85.2	1887	22.0	1878	15
Virginia	Lynchburgh	78.0	32.7	91.3	1884	28.0	1879	16
Do	Norfolk	75.8	40.8	89.0	1881, 1884	31.0	1876	18
Washington	Spokane Falls	81.5	23.0	77.0	1886	12.3	1887	8
Do	Olympia	74.0	35.0	73.0	1880	23.0	1881	12
Wisconsin	La Crosse	73.0	25.6	84.0	1884	6.2	1887	16
Do	Milwaukee	72.6	30.1	83.1	1884	14.8	1887	18
Wyoming	Cheyenne	72.0	16.5	81.6	1887	− 4.0	1878	16

RANGES OF TEMPERATURE.

The monthly and the greatest and least daily ranges of temperature at Signal Service stations are given in the table of miscellaneous meteorological data. The greatest monthly ranges occurred in the Missouri Valley, where, in localities, they exceeded 60°. They were least over southern Florida, where they were less than 20°, and at stations on the south New England and North Carolina coasts, where they were less than 30°. Along the Pacific coast the ranges were less than 30°, except at Los Angeles and San Francisco, Cal., where they amounted to 54° and 37°.3, respectively.

The following are some of the extreme monthly ranges:

Greatest.		Least.	
	°		°
Fort Assinaboine, Mont	62.8	Key West, Fla	19.8
Huron, Dak	62.0	Jupiter, Fla	24.9
Fort Custer, Mont	61.5	Pysht, Wash	25.0
Concordia, Kans	60.2	San Diego, Cal	27.0
Spokane Falls, Wash	58.5	Hatteras, N. C	27.8
Los Angeles, Cal	54.0	Block Island, R. I	28.2

FROST.

Frost occurred south of the fortieth meridian as follows: 1st, Ala., Ga., Md., Nev., N. C., S. C., Tenn., Utah. 2d, Colo., Ill., Ind., Kans. 3d, Ala., Del., D. C., Ga., Ill., Ind., Kans., Ky., Md., Miss., Mo., Nev., N. J., N. C., Ohio, Pa., S. C., Tenn., Utah, Va., W. Va. 4th, Ala., Del., D. C., Ga., Ind., Ky., Md., Nev., N. J., N. Mex., N. C., Ohio, Pa., S. C., Tenn., Va., W. Va. 5th, Nev., N. Mex. 6th, Ill., Kans., Utah. 7th, Col., Ill., Kans., Mo., Nev. 8th, Ala., Colo., Ill., N. Mex., W. Va. 9th, Del., D. C., Ill., Ind., Md., Nev., N. J., N. Mex., Ohio, W. Va. 10th, Colo., Del., D. C., Ill., Ind., Ky., Md., Nev., N. J., N. C., Ohio, Va., W. Va. 11th, Ill., Kans., Nev., N. Mex. 12th, Ala., Ill., Kans., Mo., Nev., N. Mex., Tenn. 13th, Colo., Ill., Kans., Mo., Nev., Tenn. 14th, Ala., Colo., Ill., Mo., Nev., S. C., Tenn., Utah. 15th, Ariz., Colo., Del., Kans., Md., Nev., N. J., N. C., S. C., Utah, Va. 16th, Colo., Ill., Mo., Nev., N. Mex., Utah. 17th, Ill., Ind., Kan., Mo. 18th, D.

C., Ill., Md., Nev., N. J., Va., W. Va. 19th, Cal., Colo., Kans., Nev., N. Mex., Utah. 20th, Cal., Ill., Ind., Kans., Ky., Mo., Nev., Ohio, Utah, W. Va. 21st, Ala., Ga., D. C., Ill., Ind., Kans., Ky., Mo., Nev., N. C., Ohio, S. C., Tenn., Utah, Va., W. Va. 22d, Ariz., Colo., Del., D. C., Ind., Kans., Md., Nev., N. J., N. C., Va. 23d, Ariz., Colo., D. C., Kans., Mo., Nev., N. Mex., N. C., Tex., Utah, Va., W. Va. 24th, Ariz., Colo., Ill., Ind., Kans., Nev., N. Mex., Tex., Utah. 25th, Ariz., Ill., Ind., Kans., Mo., N. J., N. Mex., Ohio, Tex., Utah. 26th, Ariz., Colo., Kans., N. Mex., Tex. 27th, Ariz., Col., Kans., Mo., Nev., Utah. 28th, Ariz., Colo., Ill., Ind., Kans., Mo., Nev., N. Mex., Ohio, Tex., Utah. 29th, Ala., Colo., Ill., Ind., Kans., Ky., Md., Miss., N. Mex., N. C., Ohio, S. C., Tenn., Va., W. Va. 30th, Del., D. C., Ill., Ind., Ky., Nev., N. J., N. M., N. C., Ohio, Pa., Va., W. Va. 31st, Del., D. C., Ill., Ky., Md., N. J., N. C., Ohio, Pa., Va., W. Va.

The following are reports of injury to vegetation by frosts during the month:

Ripley, Ohio, 2d: the late heavy frost has been very injurious to the tobacco crop in this section.

Dunkirk, Md.: a heavy frost occurred the night of the 3d–4th, causing damage to tobacco and other outstanding crops.

Boston, Mass., 9th: the frost, rain, and snow of last week caused considerable damage to crops in many plaees throughout New England.

To the southward of the fortieth parallel frost was most frequently noted in the central valleys; in the south Atlantic states it was reported as far south as the thirty-third parallel; on the central Gulf coast it occurred at New Orleans on five days, while in Texas it was noted as far south as San Antonio, where it occurred on the 24th and 25th. In Arizona frost was reported on seven days; in the middle Sacramento valley on the 19th and 20th, while in northeastern California and southern Oregon its occurrence was frequently noted.

COTTON REGION REPORTS.

The rainfall was about normal in the New Orleans and Vicksburg districts; in Galveston and Little Rock districts the rainfall was about 20 and 40 per cent., respectively, below the average. In all other districts the rainfall was in excess of the average, notably in Savannah and Montgomery districts, where it was more than double the usual amount for the month.

The means of the maximum temperatures were below the average in all districts, the greatest departures occurring in the Atlanta, Wilmington, Memphis, and Montgomery districts, where they exceeded 5°. The means of the minimum temperatures were below the average in all districts, except Galveston, where they were slightly above the average of six years.

In the following table the average rainfall and the means of the maximum and minimum temperatures in the cotton region are given, for October, 1888, together with normals and extreme temperatures obtained from similar observations of the last six years:

Temperature and rainfall data for the cotton districts, October.

District. (The reporting centre for each is named below.)	Rainfall.			Temperature.							
				Maximum.			Minimum.			Extremes at any station in the district for Oct., 1888.	
	Average for Oct. of six preceding years.	Average for Oct., 1888.	Departures.	Mean for Oct. of six preceding years.	Mean for Oct., 1888.	Departures.	Mean for Oct. of six preceding years.	Mean for Oct., 1888.	Departures.	Max.	Min.
	Inches	*Inches*	*Inches.*	°	°	°	°	°	°	°	°
New Orleans..	2.66	2.47	— 0.19	79.4	77.1	— 2.3	57.6	55.5	— 2.1	88	38
Savannah.....	2.45	5.35	+ 2.90	79.7	78.4	— 1.3	58.4	55.7	— 2.7	92	35
Charleston....	2.49	4.62	+ 2.13	76.7	74.5	— 2.2	54.2	53.3	— 0.9	88	37
Atlanta	2.35	3.88	+ 1.53	74.5	69.0	— 5.5	52.6	48.9	— 3.7	86	30
Wilmington*.	2.98	3.60	+ 0.62	75.1	69.5	— 5.6	52.8	48.2	— 4.6	83	29
Memphis	2.21	2.95	+ 0.74	74.7	69.4	— 5.3	50.9	48.1	— 2.8	83	29
Galveston *...	2.86	2.24	— 0.62	80.1	79.6	— 0.5	58.1	59.0	+ 0.9	92	35
Vicksburg	2.79	2.73	— 0.06	77.6	73.8	— 3.8	55.4	52.3	— 3.1	91	40
Montgomery .	1.66	4.47	+ 2.81	78.2	73.1	— 5.1	58.1	52.7	— 5.4	85	38
Augusta	2.53	4.64	+ 2.11	76.1	71.4	— 4.7	53.3	49.7	— 3.6	84	33
Little Rock...	1.72	0.98	— 0.74	75.9	71.7	— 4.2	50.3	50.3	0.0	89	32
Mobile.....	2.02	3.09	+ 1.07	78.7	75.2	— 3.5	54.2	52.5	— 1.7	89	37

*Normal for five years.

TEMPERATURE OF WATER.

The following table shows the maximum, minimum, and mean water temperature as observed at the harbors of the several stations; the monthly range of water temperature; and the mean temperature of the air for October, 1888:

Stations.	Temperature at bottom.				Mean temperature of air at the station.
	Max.	Min.	Range.	Monthly mean.	
	°	°	°	°	°
Canby, Fort, Wash.....	60.8	53.7	7.1	57.4	55.2
Cedar Keys, Fla	80.0	69.9	10.1	74.5	70.0
Charleston, S. C.....	72.8	67.1	5.7	69.7	64.2
Eastport, Me	50.2	47.6	2.6	48.8	43.4
Galveston, Tex	79.0	68.0	11.0	74.6	72.2
Key West, Fla.....	84.0	75.3	8.7	80.1	79.1
New York City	62.9	50.7	12.2	55.7	49.2
Pensacola, Fla	77.0	69.8	7.2	73.8	67.2
Portland, Me	57.1	46.8	10.3	49.8	43.3
Portland, Oregon	65.0	53.0	12.0	60.2	55.5

PRECIPITATION (expressed in inches and hundredths).

The distribution of precipitation over the United States and Canada for October, 1888, as determined from the reports of about one thousand stations, is exhibited on chart iv. In the table of miscellaneous meteorological data are given, for each Signal Service station, the total precipitation, with the departure from the normal. The figures opposite the names of the geographical districts in the columns for precipitation and departure from the normal show, respectively, the averages for the several districts. The normal for any district may be found by adding the departure to the current mean when the precipitation is below the normal and subtracting when above.

From the October chart it will be seen that the monthly rainfall was greatest on the north Pacific coast, where it reached twelve inches; more than eight inches fell in portions of the Canadian Maritime Provinces and northern New England, and from six to eight inches fell in portions of the south Atlantic states, and in southern Louisiana in the vicinity of New Orleans; in the Lake region, and, with the exception of the southern plateau and north Pacific coast, in all districts west of the Mississippi River, less than 75 per cent. of the normal amount of rain fell, that for the lower Missouri and Rio Grande valleys being less than half the normal; in Florida the rainfall averaged about 67 per cent. of the normal; in New England and the middle Atlantic states the rainfall exceeded the average by about 15 per cent., and in the south Atlantic and east Gulf states and on the north Pacific coast 30 per cent. Over a large part of California there was a total absence of rain, and so far as shown by the reports of the Signal Service and voluntary observers but little rain fell in any part of the state. A newspaper report from Campo, however, states that rain began falling there on the evening of the 17th, and continued about forty-eight hours, two and a half inches having fallen up to that time. The average rainfall in California for October, as determined from Signal Service observations, is slightly more than an inch for the northern part of the state, and somewhat less than half an inch for the southern part.

DEVIATIONS FROM AVERAGE PRECIPITATION.

The following table shows for certain stations, as reported by voluntary observers, (1) the average precipitation for a series of years; (2) the length of record during which the observations have been taken, and from which the average has been computed; (3) the total precipitation for October, 1888; (4) the departure of the current month from the average;

(5) and the extreme monthly precipitation for October during the period of observation and the years of occurrence:

State and station.	County.	(1) Average for the month of Oct.	(2) Length of record.	(3) Total for Oct., 1888.	(4) Departure from average.	(5) Extreme monthly precipitation for Oct.			
						Greatest.		Least.	
						Am't.	Year.	Am't.	Year.
Arkansas.		*Inches*	*Years*	*Inches*	*Inches.*	*Inches*		*Inches.*	
Lead Hill	Boone	5.04	7	3.10	−1.94	18.11	1883	0.10	1886
California.									67, 68
Sacramento	Sacramento	0.70	22	0.00	−0.70	3.01	1876	0.00	87, 88
Connecticut.									
Southington	Hartford	3.28	19	4.70	+1.42	7.93	1877	0.87	1874
Florida.									
Merritt's Island	Brevard	6.13	11	3.31	−2.82	11.94	1886	1.74	1882
Illinois.									
Aurora	Kane	3.80	10	3.10	−0.70	.....	.....	.....	.....
Goleonda	Pope	3.61	11	2.58	−1.03	.....	.....	.....	.....
Peoria	Peoria	2.65	33	2.29	−0.36	5.68	1877	0.70	1860
Riley	McHenry	2.61	28	1.70	−0.91	.....	.....	.....	.....
Sandwich	De Kalb	3.25	38	2.95	−0.30	.....	.....	.....	.....
Indiana.									
Spiceland	Henry	2.48	27	3.91	+1.43	7.02	1884	0.10	1879
Vevay	Switzerland	2.65	22	4.13	+1.48	7.67	1883	0.28	1879
Iowa.									
Cresco	Howard	2.44	16	0.85	−1.59	.....	.....	.....	.....
Independence	Buchanan	3.04	13	2.07	−0.97	6.50	1881	0.90	1876
Monticello	Jones	2.93	35	2.02	−0.91	7.21	1881	0.43	1872
Kansas.									
Independence	Montgomery	2.96	15	3.56	+0.58	7.16	1883	0.75	1874
Lawrence	Douglas	2.89	21	3.74	+0.85	6.96	1870	0.44	1878
Yates Centre	Woodson	3.30	8	1.96	−1.34	8.52	1881	1.16	1886
Louisiana.									
Point Pleasant	Tensas	4.35	13	3.45	−0.90	.....	.....	.....	.....
Maine.									
Gardiner	Kennebec	4.49	50	6.71	+2.22	13.15	1855	0.40	1839
Maryland.									
Cumberland	Alleghany	1.95	17	2.60	+0.65	4.30	1872	0.00	1879
Massachusetts.									
Somerset	Bristol	3.85	18	3.09	−0.76	.....	.....	.....	.....
Newburyport	Essex	3.47	10	5.66	+2.19	6.83	1885	0.81	1886
Michigan.									
Adrian	Lenawee	3.66	11	1.64	−2.02	.....	.....	.....	.....
Thornville	Lapeer	2.97	12	2.79	−0.18	.....	.....	.....	.....
Kalamazoo	Kalamazoo	3.15	13	2.46	−0.69	5.81	1881	1.29	1886
New Jersey.									
South Orange	Essex	3.52	19	5.86	+2.34	7.19	1877	.....	.....
Moorestown	Burlington	3.18	25	4.14	+0.96	6.83	1877	0.47	1879
New York.									
Palermo	Oswego	3.43	35	2.20	−1.23	7.90	1862	0.30	1882
Humphrey	Cattaraugus	3.53	6	4.27	+0.74	4.27	1888	1.55	1886
Ohio.									
North Lewisburg	Champaign	2.15	16	4.85	+2.70	5.45	1881	0.45	1887
Tiffin	Seneca	1.63	4	2.09	+0.46	2.31	1885	0.94	1887
Wauseon	Fulton	2.89	16	1.93	−0.96	8.92	1881	0.93	1874
Oregon.									
Albany	Linn	3.36	10	3.26	−0.12	7.08	1882	0.97	1887
Pennsylvania.									
Dyberry	Wayne	3.11	18	3.97	+0.86	6.55	1881	1.23	1882
Grampian Hills	Clearfield	2.78	19	4.50	+1.72	4.74	1873	0.81	1887
Wellsborough	Tioga	4.65	10	6.69	+2.04	7.50	1885	1.88	1886
South Carolina.									
Statesburgh	Sumter	3.08	8	3.05	−0.03	8.15	1887	0.02	1884
Tennessee.									
Milan	Gibson	2.60	6	3.01	+0.41	4.72	1883	0.90	1886
Texas.									
New Ulm	Austin	4.01	17	3.50	−0.51	13.44	1881	0.79	1874
Vermont.									
Strafford	Orange	3.23	14	4.85	+1.62	5.90	1885	1.20	1882
Virginia.									
Bird's Nest	Northampton	3.26	19	2.21	−1.05	9.25	1872	0.00	1884
Wytheville	Wythe	3.03	24	5.05	+2.02	9.40	1860	0.50	1875

HAIL.

Descriptions of the more severe hail storms of the month are given under "Local storms." In addition to those given under that heading, hail is reported to have fallen in the various states and territorries as follows:

1st, Ill., Ind., Ohio, W. Va. 2d, Ill., N. H., N. Y., Ohio. 3d, Mass., N. Y. 5th, Kans., Mo. 6th, Md. 8th, N. Y., Pa. 9th, Nebr. 11th, Pa. 13th, N. J. 14th, Kans. 15th, Dak., Ill. 16th, N. Y., Pa. 17th, Iowa, Mass., N. J. 18th, Ill., Ind., Mich., Mo. 19th, Conn., Mich. 20th, Mich., Ohio, Pa. 21st, Ind., Iowa, Mo. 22d, Pa. 24th, Me. 26th, Ill., Ind., Mich. 27th, Mich., Wis. 28th, Mich. 29th, Me., Pa. 31st, Me., N. H., Oregon.

SLEET.

Sleet fell during October on the several dates as follows:

2d, N. Y., Vt., Wis. 3d, N. Y., Pa. 7th, Mo. 8th, N. Y. 9th, Vt., W. Va. 11th, Va. 18th, Mich., Ohio. 19th, Dak., Kans., Mich., Minn., Pa., Wis. 20th, N. Y., Ohio, Pa. 21st, Ill., Iowa, Mo., Nebr., N. Y. 22d, Ohio. 24th, Me. 27th, Iowa. 28th, Mich., Ohio. 29th, Minn.

SNOW.

Snow was reported from but few stations southward of the fortieth parallel and eastward of the Rocky Mountains. Northward of that parallel the most general snowfalls of the month were those occurring in the Lake region and northern part of the middle Atlantic states on the 2d and 3d, in New England on the 9th, and from the Missouri Valley eastward to the lower lakes from the 19th to 21st. With the exception of elevated stations the most southerly point reporting snow in October was Worthington, Ind. (latitude about 39° 8′), on the 18th.

MONTHLY SNOWFALLS (in inches and tenths).

The largest monthly snowfalls were those which occurred in northern New England, the upper Michigan peninsula, and in portions of Montana and Colorado, where depths ranging from 4 to 10 were recorded. The largest fall, 10, occurred at East Berkshire, Vt., the next largest being 8 at Mayfield, Me., Calumet, Mich., and Georgetown, Col. In other than the above named districts the monthly snowfalls amounted to less than 1, with the exception of portions of Iowa, Nebraska, Minnesota, Wisconsin, and western New York, where they ranged from 1 to 3.

Snowfalls of one inch, or more, occurred as follows: *Colorado.*—Georgetown, 8. *Dakota.*—Fort Buford, 1.4; Fort Totten, 1. *Iowa.*—Dysart, Osceola, and Vinton, 3; Des Moines and Grinnell, 2; Glenwood and Independence, 1.5; Clarinda and Fayette, 1. *Maine.*—Mayfield, 8; Belfast and Orono, 5; Kent's Hill, 4; Cornish, 3; Gardiner, 2; Bar Harbor, 1. *Massachusetts.*—Dudley, 1. *Michigan.*—Calumet, 8; Marquette, 4.5; Atlantic, 4; Lathrop, 3.8. *Minnesota.*—Red Wing, 2.1; Grand Meadow, 2; Lake Winnibigoshish, Leech Lake, and Pokegama Falls, 1. *Montana.*—Fort Maginnis, 6.1; Helena, 2.5. *Nebraska.*—Valentine, 5; Ashland, 2.3; Crete, 2; North Loup, 1.2; Sargent, 1. *New Hampshire.*—Wolfborough, 4.6; West Milan, 4; Manchester, 1.8; Walpole, 1. *New Mexico.*—Las Vegas, 1.8; Santa Fé, 1. *New York.*—Humphrey, 3. *Ohio.*—Wauseon, 1. *Vermont.*—East Berkshire, 10; Lunenburg and Strafford, 3; Chelsea, 2; Burlington, 1. *Washington Territory.*—Spokane Falls, 1. *Wisconsin.*—Deuster, 2.

But two stations report snow on ground at end of month: Fort Maginnis, Mont., 0.5 inch, and Poplar River, Mont., trace.

EXCESSIVE PRECIPITATION FOR OCTOBER.

The number of stations showing monthly rainfalls amounting to, or exceeding, 10 inches, in October, as compared with those giving similar data for September and the preceding summer months, is decidedly less, and the area of country subjected to same, consequently less extended. This statement, however, does not apply to the north Pacific coast where the normal rainfall for October is more than double that for September, but in that region the area over which the rainfall reaches or exceeds ten inches is confined to a very narrow strip along the coast, north of the forty-fifth parallel. As in previous months these excessive monthly rainfalls have been most frequent in the states bordering on the Atlantic and Gulf, although the records at many of the older established stations in these districts show that no monthly falls reaching the ten-inch limit have occurred, and at but one of the regular Signal Service stations have they been recorded at a greater average frequency than one for a period of six years, viz.: Hatteras, N. C., where three have occurred since 1880, Galveston, Tex., and Mount Washington, N. H., following next in order of frequency with an average of one for each six-year period.

The data for October show that at not more than thirty per cent. of the Signal Service stations to the eastward of the Mississippi River have rainfalls reached ten inches in this month. When it is considered that a majority of these stations have records exceeding fifteen years, in connection with the small number of ten-inch rainfalls recorded, it may be stated that they

are of uncommon occurrence in any part of the country during the month of October. The following are some of the greatest October rainfalls on the records of the Signal Service: Mayport, Fla., 20.03, in 1880; Key West, Fla., 19.77, in 1883; Rabun Gap, Ga., 19.40, in 1879; Mount Washington, N. H., 18.38, in 1881; Lead Hill, Ark., 18.11, in 1883; White Plains, N. Y., 18.09, in 1877. To the westward of the one hundredth meridian no October rainfalls have reached 10 inches with the exception of those occurring on the north Pacific coast and the single instance of 12.95 at Summit, Cal., in 1882. At Fort Robinson, Nebr., 8.60 fell in 1887, this amount being greater than was recorded at any other station on the eastern slope of the Rocky Mountains or in the plateau regions.

While, as above stated, there is a decided diminution in the number of stations reporting excessive monthly rainfalls in October, as compared with previous months, the same cannot be said with respect to excessive daily rainfalls, with the exception, however, of the Lake region and central valleys, where they were somewhat less frequent than in September. In the Gulf and Atlantic coast states, where daily rainfalls of 2.50 inches, or more, have been most numerous, their distribution and frequency for the months of September and October have been much the same. The accompanying table of excessive precipitation shows that since 1870 the maximum number of excessive daily rainfalls occurred during the years 1877 and 1887, and, not considering the period prior to 1876—since which time the number of rainfall stations has been largely increased—the years in which the least number of excessive daily rainfalls was recorded are 1879 and 1886, the number recorded in the former years being more than double that of the latter. The states most subjected to these excessive daily rainfalls are Texas (principally the region along the coast), Florida, and North Carolina. An examination of the records, with reference to dates, shows that the average periods of maximum frequency for the whole series of observation are as follows: 3d–4th, 10–12th, and 17th–23d; the periods of minimum frequency being the 5th–6th, 13–16th, 24–25th, and 30th–31st. Some of the most noteworthy falls are the following: Fernandina, Fla., 13.14, 20th–21st, 1882; Newport, Fla., 8.20, 8th, 1876; Saint Augustine, Fla., 10.31, 9–10th, 1880; Sanford, Fla., 6.09, 10th, 1885; Baton Rouge, La., 6.70, 18th, 1877; Hazlehurst, Miss., 6.00, 17th, 1887; Fort Robinson, Nebr., 7.07, 23d, 1887; Charleston, S. C., 6.15, 20th, 1876; Brackettville, Tex., 13.08, 1st–2d, 1881; Galveston, Tex., 7.77, 2d, 1871; Sour Lake, Tex., 6.80, 13th, 1886.

It will be seen from the table of excessive precipitation that very few rainfalls amounting to one inch per hour have occurred during October in any part of the United States; none were recorded in the region westward of the Rocky Mountains, and in many states to the eastward they have not occurred. From the west Gulf coast northward to the Missouri valley they have been more numerous than in any other part of the country. There are only a few instances in which more than one rainfall of an inch, or more, per hour has occurred at a single station, and in no case have more than two occurred at any one place during the series of observation.

The following table shows some of the heaviest rainfalls of short duration reported, and the rate of fall per hour:

Station.	Year.	Date.	Actual fall.	Duration.	Rate per hour.
			Inches.	*h. m.*	*Inches.*
Des Moines, Iowa	1880	15	2.30	0 30	4.60
Asheville, N. C	1879	17–18	6.40	4 00	1.60
Abilene, Tex	1885	24	1.50	0 25	3.60
Brackettville, Tex	1880	1–2	10.97	8 00	1.37
Galveston, Tex	1877	30	2.12	0 25	5.10
New Ulm, Tex	1879	2	2.38	1 05	2.20
Rio Grande City, Tex	1879	1	1.24	0 35	2.12
Fort Scott, Kans	1881	2	1.80	0 20	5.40
Boonesborough, Iowa	1878	10	1.15	0 30	2.30
Cresco, Iowa	1878	10	1.11	0 30	3.33
Holton, Kans	1883	1	2.50	1 05	2.31
Emory Grove, Md	1878	22	4.00	3 00	1.33
Fort Robinson, Nebr	1887	23	7.07	5 30	1.28

Table showing for the month of October monthly rainfalls of 10 inches, or more (in states where monthly rainfalls did not reach 10 inches the station reporting the maximum amount is given); rainfalls of 2.50 inches, or more, in any 24 consecutive hours; and rainfalls equaling or exceeding one inch in one hour.

States and stations.	Rainfall of 10 inches, or more, per month.		Rainfall of 2.50 inches, or more, in 24 hours.			Rainfall equaling or exceeding one inch per hour.			
	Year.	Amt.	Year.	Day.	Amt.	Year.	Day.	Time.	Amt.
Alabama.		*Inches.*			*Inches*			*h. m.*	*Inches*
Bermuda	.....	.....	1887	19	3.09	.....	...	.....	.....
Florence	.....	.....	1887	25	4.00	.....	...	.....	.....
Gadsden	.....	.....	1887	20	2.50	.....	...	.....	.....
Livingston	.....	.....	1887	18	2.71	.....	...	.....	.....
Marion	.....	.....	1887	17	2.78	.....	...	.....	.....
Do	.....	.....	1888	15	3.07	.....	...	.....	.....
Mobile	.....	.....	1871	3–4	3.07	.....	...	.....	.....
Do	.....	.....	1878	9	2.72	.....	...	.....	.....
Do	.....	.....	1880	28–29	3.31	.....	...	.....	.....
Do	.....	.....	1882	31	5.20	1882	31	1 00	1.04
Montgomery	1879	10.20	1879	17	3.46	.....	...	.....	.....
Mount Vernon	.....	.....	1887	19	3.92	1888	25	0 45	1.08
Tuscaloosa	.....	.....	1882	19	3.10	.....	...	.....	.....
Arizona.									
Fort Apache	1881	4.68	.....	.....	.....	.....	...	.....	.....
Arkansas.									
Fort Smith	.....	.....	1881	1	3.75	.....	...	.....	.....
Do	.....	.....	1887	8–9	2.70	.....	...	.....	.....
Franklin	.....	.....	1881	1	3.48	.....	...	.....	.....
Lead Hill	1883	18.11	.....	.....	.....	.....	...	.....	.....
Little Rock	.....	.....	1882	28–29	2.97	.....	...	.....	.....
Mount Ida	.....	.....	1883	19	2.70	1883	24	1 00	1.00
California.									
Fort Gaston	1876	12.50	.....	.....	.....	.....	...	.....	.....
Summit	1882	12.95	.....	.....	.....	.....	...	.....	.....
Colorado.									
Pike's Peak	1880	4.64	.....	.....	.....	.....	...	.....	.....
Connecticut.									
Canton	1869	14.70	.....	.....	.....	.....	...	.....	.....
Columbia	.....	.....	1875	7	2.56	.....	...	.....	.....
Do	.....	.....	1875	30–31	4.10	.....	...	.....	.....
New Haven	1877	10.09	1888	6–7	2.61	.....	...	.....	.....
New London	.....	.....	1871	12	4.34	.....	...	.....	.....
Do	.....	.....	1877	4–5	2.99	.....	...	.....	.....
Do	.....	.....	1885	13–14	2.51	.....	...	.....	.....
Shelton	.....	.....	1888	6	3.52	.....	...	.....	.....
Southington	.....	.....	1877	4–5	3.50	.....	...	.....	.....
Dakota.									
Deadwood	.....	.....	1879	15–16	3.47	.....	...	.....	.....
Pembina	1878	6.61	1878	1	2.56	.....	...	.....	.....
Delaware.									
Delaware Breakwater	1883	5.12	.....	.....	.....	.....	...	.....	.....
Dover	.....	.....	1877	3–4	3.30	.....	...	.....	.....
District of Columbia.									
Receiving Reservoir	1885	10.88	.....	.....	.....	.....	...	.....	.....
Washington City	.....	.....	1872	25	3.12	1875	23	1 00	1.40
Do	.....	.....	1873	19–20	2.86	1877	4	1 00	1.49
Do	.....	.....	1877	4	3.98	1885	29	1 00	1.20
Do	.....	.....	1878	22	3.31	.....	...	.....	.....
Florida.									
Biscayne	1874	13.30	.....	.....	.....	.....	...	.....	.....
Do	1876	15.30	.....	.....	.....	.....	...	.....	.....
Do	1879	14.48	.....	.....	.....	.....	...	.....	.....
Cedar Keys	1880	10.37	1880	7–8	3.95	.....	...	.....	.....
Do	.....	.....	1880	21–22	3.19	.....	...	.....	.....
Do	.....	.....	1882	10–11	2.81	.....	...	.....	.....
Daytona	.....	.....	1876	18–20	8.20	.....	...	.....	.....
Fernandina	1882	17.17	1882	20–21	13.14	.....	...	.....	.....
Do	.....	.....	1883	16	2.84	.....	...	.....	.....
Do	.....	.....	1883	17	5.33	.....	...	.....	.....
Do	.....	.....	1885	11	2.50	.....	...	.....	.....
Fort Barrancas	1879	12.11	1878	10	5.39	.....	...	.....	.....
Do	.....	.....	1878	29	2.75	.....	...	.....	.....
Do	.....	.....	1879	18	4.53	.....	...	.....	.....
Do	.....	.....	1879	27	3.04	.....	...	.....	.....
Do	.....	.....	1880	16	3.07	.....	...	.....	.....
Do	.....	.....	1880	27	3.62	.....	...	.....	.....
Homeland	.....	.....	1881	10	2.90	.....	...	.....	.....
Jacksonville	1880	16.25	1872	22–23	5.94	1873	3	0 45	1.00
Do	1882	10.30	1873	3	4.14	.....	...	.....	.....
Do	.....	.....	1876	8–9	3.15	.....	...	.....	.....
Do	.....	.....	1877	1	3.29	.....	...	.....	.....
Do	.....	.....	1880	7–8	4.43	.....	...	.....	.....
Do	.....	.....	1880	9–10	4.03	.....	...	.....	.....
Do	.....	.....	1882	20–21	3.39	.....	...	.....	.....
Do	.....	.....	1882	21–22	3.29	.....	...	.....	.....
Do	.....	.....	1883	16–17	4.23	.....	...	.....	.....
Do	.....	.....	1885	10–11	2.97	.....	...	.....	.....
Key West	1879	14.20	1874	12	2.54	.....	...	.....	.....
Do	1883	19.77	1876	19–20	3.75	.....	...	.....	.....
Do	.....	.....	1878	20–21	3.97	.....	...	.....	.....
Do	.....	.....	1879	12–13	4.22	.....	...	.....	.....
Do	.....	.....	1883	20–21	9.24	.....	...	.....	.....
Do	.....	.....	1885	9–10	2.60	.....	...	.....	.....
Do	.....	.....	1887	8–9	2.73	.....	...	.....	.....
Live Oak	.....	.....	1882	11	4.75	.....	...	.....	.....
Mayport	1880	20.03	1877	3	6.32	.....	...	.....	.....
Do	.....	.....	1885	10–11	4.98	.....	...	.....	.....
Merritt's Island	1879	11.30	1878	22	3.00	1885	10	1 05	1.87
Do	1883	11.82	1879	2	2.61	.....	...	.....	.....
Do	1886	11.94	1879	6	2.60	.....	...	.....	.....
Do	.....	.....	1883	17	3.17	.....	...	.....	.....
Do	.....	.....	1883	21	3.70	.....	...	.....	.....
Do	.....	.....	1886	11	3.39	.....	...	.....	.....
Newport	1876	17.55	1876	7	4.40	.....	...	.....	.....

Table showing for the month of October, &c.—Continued.

States and stations.	Rainfall of 10 inches, or more, per month.		Rainfall of 2.50 inches, or more, in 24 hours.			Rainfall equaling or exceeding one inch per hour.			
	Year.	Amt.	Year.	Day.	Amt.	Year.	Day.	Time.	Amt.
Florida—Continued.		*Inches.*			*Inches*			*h. m.*	*Inches*
Newport			1876	8	8.20				
Do			1876	9	3.00				
Pensacola			1880	16	2.80				
Do			1881	23	2.65				
Saint Augustine	1880	14.29	1880	9–10	10.31				
Do	1882	12.71	1882	20–23	11.54				
Do			1887	13	3.30				
Saint Marks	1877	10.61	1877	1–3	7.38				
Do	1879	12.94	1878	10	3.30				
Sanford			1885	10	6.09				
Do			1886	10–11	3.28				
Tallahassee			1888	10	3.30				
Titusville	1887	13.17	1887	16	3.43	1887	16	1 00	1.00
Do			1887	19	3.92	1887	19	3 12	3.92
Georgia.									
Albany			1882	20	2.50				
Allapaha			1882	21	5.00				
Do			1888	27	3.45				
Augusta			1886	10–11	2.64				
Bainbridge			1887	27	4.30				
Brunswick	1880	12.22							
Ellerslie	1885	10.50							
Jesup	1885	10.02	1882	11	2.78				
Do			1885	11	5.74				
Do			1885	12	3.76				
Do			1888	27	3.45				
Leo	1879	10.05							
Millen			1887	27	3.60				
Oglethorpe Barracks			1877	3	2.56				
Quitman	1876	16.55	1876	7–11	14.25				
Do	1877	13.30	1877	1–3	8.90				
Do			1879	26–27	3.00				
Do			1880	7–8	3.70				
Do			1882	11	2.70				
Raisin Gap	1879	19.40							
Do	1885	11.20							
Saint Mary's			1877	1–2	2.60				
Savannah			1868	4	2.80				
Do			1870	11	3.28				
Do			1872	22–23	2.71				
Do			1876	9–10	3.05				
Do			1876	19–20	3.10				
Do			1877	3	2.93				
Do			1885	11–12	4.82				
Do			1888	10–11	2.77				
Smithville			1887	20	2.80				
Thomasville	1879	13.78	1878	10	4.97				
Do			1879	22	4.40				
Do			1887	19	3.00				
Toccoa			1885	12	2.65				
Union Point			1887	26	4.00				
Way Cross			1882	11	2.72				
Idaho.									
Boisé City	1883	4.06							
Illinois.									
Anna			1877	19	2.88				
Do			1881	9	3.30				
Do			1883	18	2.44				
Atwood			1888	18	3.12				
Cairo			1879	18	2.53	1871	25	0 50	1.10
Do			1883	18	3.07	1880	3	0 50	1.00
Charleston			1881	17	2.50				
Do			1881	28	2.50				
Chicago			1877	19–20	3.55				
Collinsville			1885	19	2.50				
Gibson City			1888	18	2.62				
Lacon			1888	18	2.69				
Mattoon	1881	11.25							
Philo			1888	18	3.60				
Richmond			1888	18	2.79				
Springfield	1881	10.62	1881	3	3.19				
Stephenson			1886	14	2.50				
Sterling			1878	26	3.56				
Swanwick			1881	3	2.65	1881	6	1 45	2.25
Do			1883	28	3.15				
Wyanet			1873	5–6	3.50				
Indiana.									
Arlington						1879	11	1 00	1.00
Clinton	1883	10.06	1883	28	4.50				
Franklin			1883	26	2.92				
Glenwood			1883	28	2.64				
Greencastle	1883	10.22							
Martinsville	1883	11.83	1883	29	3.78				
Mitchell	1883	14.60?	1883	18	3.50				
Richmond			1883	29	3.18				
Rising Sun			1881	3	2.75				
Stablesville			1883	29	3.19				
Terre Haute	1883	10.93							
Vevay						1881	4	0 40	1.20
Indian Territory.									
Fort Reno			1883	17	2.60				
Do			1887	7–8	5.65				
Fort Sill	1886	7.10	1877	14	4.18	1886	20	1 45	1.80
Do			1884	20–21	3.65				
Do			1886	7–8	3.68				
Do			1886	20–21	3.05				
Do			1887	7–8	5.44				
Iowa.									
Amana			1886	13–14	2.74				
Boonesborough						1878	10	0 30	1.15
Clinton			1886	13–14	3.56				

Table showing for the month of October, &c.—Continued.

States and stations.	Rainfall of 10 inches, or more, per month.		Rainfall of 2.50 inches, or more, in 24 hours.			Rainfall equaling or exceeding one inch per hour.			
	Year.	Amt.	Year.	Day.	Amt.	Year.	Day.	Time.	Amt.
Iowa—Continued.		*Inches.*			*Inches*			*h. m.*	*Inches*
Cresco						1878	10	0 20	1.11
Davenport			1884	6–7	4.12	1887	6	1 05	1.30
Des Moines			1880	15–16	2.82	1880	15	0 30	2.30
Do			1884	7–8	3.72				
Dubuque			1886	13–14	2.69				
Elkader			1886	14	3.25				
Fairfield			1884	6–7	3.40				
Garnavillo			1886	13	3.22				
Hamlin (Audubon P. O.)			1884	1	2.50				
Do			1884	3–4	2.50				
Do			1885	12	2.50				
Manchester			1886	13–14	6.70				
Monticello			1886	22–23	2.59				
Mount Pleasant			1884	6–7	2.90				
Muscatine			1885	19	2.80				
Do			1886	14	3.70				
Nora Springs	1881	11.10				1879	16	1 00	1.50
Urbanna			1886	12	2.65				
Kansas.									
Clay Centre	1882	11.42	1883	16–17	4.71				
Creswell			1878	3	3.00	1878	3	2 00	3.00
Do			1882	7	3.29				
Dodge City						1882	6	1 30	1.50
Fort Larned			1870	29	2.60				
Fort Scott						1881	2	0 20	1.80
Holton			1883	1	2.50	1883	1	1 05	2.50
Leavenworth			1876	31–1*	2.81				
Do			1880	2–3	2.56				
Do			1887	7–8	3.10				
Manhattan			1877	3	2.90				
Pretty Prairie			1883	17	3.25	1882	6	2 00	2.00
Salina			1883	4	2.60				
Do			1883	16	2.70				
Sedgwick			1877	2	2.50				
Topeka			1887	7–8	2.92				
Wellington			1882	7	4.18				
Do			1887	7–8	6.06				
Do			1877	24	2.60				
Kentucky.									
Frankfort			1883	28–29	6.17				
Louisville			1876	29	4.12				
Do			1880	15	2.64				
Do			1883	29	2.55				
Paducah	1880	14.39?	1880	16	2.92				
Louisiana.									
Amite City			1884	26	3.01				
Do			1887	19	3.65				
Alexandria			1882	18	2.62				
Do			1888	22	2.62				
Baton Rouge	1877	16.75	1877	18	6.70				
Do			1877	26	2.50				
Do			1877	29	2.60				
Cheneyville			1884	26	2.95				
Do			1888	22	2.80				
Clinton			1884	26	2.82				
Do			1888	22	2.50				
Franklin			1884	26	4.08				
Lafayette			1884	26	3.45				
Marksville			1888	21	2.75				
Monroe			1882	18	3.07				
Do			1887	24	2.56				
Natchitoches			1883	20	3.30				
Do			1887	24	2.90				
New Iberia			1854	26	5.81				
New Orleans			1871	2	2.95	1884	21	1 00	1.00
Do			1871	30	3.04	1888	22	1 00	2.00
Do			1877	24–25	2.54				
Do			1877	29–30	3.52				
Do			1887	18–19	3.19				
Do			1888	22	4.13				
Point Pleasant	1880	13.04	1880	3–4	3.01				
Do	1881	13.69	1880	27–30	8.60				
Port Eads			1884	27	3.81				
Shreveport			1872	28	2.71				
Do			1881	23	2.63				
Do			1881	27	3.80				
Do			1882	17	4.10				
Do			1885	25	2.73				
Do			1887	23	2.92				
Thibodeaux			1884	26	3.24				
West Milville			1887	19	3.10				
Whiteville			1884	26	5.31				
Maine.									
Cornish			1886	31	3.47				
Eastport			1881	18	2.76				
Do			1888	7–8	3.04				
Gardiner	1855	13.15	1878	23–24	4.91				
Do	1869	12.67							
Kent's Hill			1886	31	2.62				
Orono			1888	8	3.18				
Oxford	1869	15.10							
Perry	1855	10.50							
Portland			1871	12	2.68				
Do			1873	6–7	3.93				
Do			1878	23–24	2.79				
Do			1880	30–31	2.69				
Do			1886	29–30	2.60				
West Waterville			1878	23–24	6.30				
Williamsburg	1869	15.10							
Maryland.									
Baltimore			1873	20	3.42				

Table showing for the month of October, &c.—Continued.

States and stations.	Rainfall of 10 inches, or more, per month.		Rainfall of 2.50 inches, or more, in 24 hours.			Rainfall equaling or exceeding one inch per hour.			
	Year.	Amt.	Year.	Day.	Amt.	Year.	Day.	Time.	Amt.
Maryland—Continued.		*Inches.*			*Inches*			*h. m.*	*Inches*
Baltimore	.....	.....	1875	28	2.64	.....	.....	.....	.....
Do	.....	.....	1877	4	2.74	.....	.....	.....	.....
Do	.....	.....	1878	23	2.75	.....	.....	.....	.....
Emmitsburg	.....	.....	1877	4	4.12	.....	.....	.....	.....
Do	.....	.....	1878	22-23	3.58	.....	.....	.....	.....
Do	.....	.....	1881	28-29	2.60	.....	.....	.....	.....
Do	.....	.....	1885	20	2.55	.....	.....	.....	.....
Emory Grove	.....	.....	1878	22	4.00	1878	22	3 00	4.00
Fallston	.....	.....	1877	4	5.09	.....	.....	.....	.....
Do	.....	.....	1878	22-23	2.60	.....	.....	.....	.....
Fort Foote	.....	.....	1872	25	2.65	.....	.....	.....	.....
Do	.....	.....	1877	5	3.16	.....	.....	.....	.....
Fort McHenry	.....	.....	1873	19-20	2.74	.....	.....	.....	.....
Fort Washington	.....	.....	1869	3-4	5.68	.....	.....	.....	.....
New Market	.....	.....	1877	4	5.14	.....	.....	.....	.....
Owing's Mills	.....	.....	1877	4	3.61	.....	.....	.....	.....
Sandy Springs	.....	.....	1877	8	2.50	.....	.....	.....	.....
Do	.....	.....	1878	22	3.57	.....	.....	.....	.....
Woodstock College	1885	10.23	1877	4	5.20	.....	.....	.....	.....
Do	.....	.....	1878	22-23	3.05	.....	.....	.....	.....
Do	.....	.....	1885	2-3	3.10	.....	.....	.....	.....
Do	.....	.....	1885	12-13	2.50	.....	.....	.....	.....
Massachusetts.									
Boston	.....	.....	1871	11-12	4.22	.....	.....	.....	.....
Do	.....	.....	1875	6-7	2.55	.....	.....	.....	.....
Do	.....	.....	1877	4-5	4.01	.....	.....	.....	.....
Do	.....	.....	1878	12-13	3.08	.....	.....	.....	.....
Fitchburg	1869	13.01	.....	.....	.....	.....	.....	.....	.....
Fort Independence	.....	.....	1871	11-12	4.68	.....	.....	.....	.....
Mendon	.....	.....	1878	12	3.00	.....	.....	.....	.....
Do	.....	.....	1878	23	3.45	.....	.....	.....	.....
Nantucket	.....	.....	1888	28	2.62	.....	.....	.....	.....
New Bedford	.....	.....	1877	5	3.40	.....	.....	.....	.....
Rowe	.....	.....	1877	5	2.55	.....	.....	.....	.....
Somerset	.....	.....	1877	4-5	3.61	.....	.....	.....	.....
Do	.....	.....	1878	12	3.01	.....	.....	.....	.....
Do	.....	.....	1882	14	4.54	.....	.....	.....	.....
Springfield Armory	1869	13.50	1877	4-5	3.81	.....	.....	.....	.....
Thatcher's Island	.....	.....	1877	5	3.19	.....	.....	.....	.....
Do	.....	.....	1878	11	3.78	.....	.....	.....	.....
Westborough	.....	.....	1878	23	3.05	.....	.....	.....	.....
Wood's Holl	.....	.....	1877	22	2.63	.....	.....	.....	.....
Do	.....	.....	1878	12	2.56	.....	.....	.....	.....
Worcester	.....	.....	1877	4-5	3.20	.....	.....	.....	.....
Michigan.									
Alpena	1877	13.18	1877	10-11	5.17	.....	.....	.....	.....
Do	1881	10.25	1881	14-15	3.04	.....	.....	.....	.....
Escanaba	.....	.....	1884	1-2	3.30	.....	.....	.....	.....
Grand Haven	.....	.....	1881	16-17	3.05	.....	.....	.....	.....
Litchfield	.....	.....	1875	5-6	4.50	.....	.....	.....	.....
Northport	1881	10.17	.....	.....	.....	.....	.....	.....	.....
Minnesota.									
Duluth	1877	4.92	.....	.....	.....	.....	.....	.....	.....
Moorhead	.....	.....	1884	4-5	2.57	.....	.....	.....	.....
Northfield	.....	.....	1881	11	2.84	.....	.....	.....	.....
Saint Vincent	.....	.....	1878	1	2.56	.....	.....	.....	.....
Do	.....	.....	1878	15-16	2.61	.....	.....	.....	.....
Mississippi.									
Biloxi	.....	.....	1887	19	4.60	.....	.....	.....	.....
Brookhaven	.....	.....	1883	18	4.10	.....	.....	.....	.....
Corinth	.....	.....	1883	29	2.90	.....	.....	.....	.....
Edwards	.....	.....	1883	20	3.08	.....	.....	.....	.....
Fayette	.....	.....	1881	27-28	6.20	.....	.....	.....	.....
Hazlehurst	1887	10.20	1887	17	6.00	.....	.....	.....	.....
Do	.....	.....	1887	18	4.00	.....	.....	.....	.....
Hernando	.....	.....	1883	29	2.67	.....	.....	.....	.....
Lake	.....	.....	1887	17	2.94	.....	.....	.....	.....
Natchez	1887	12.73	1869	22-23	6.00	.....	.....	.....	.....
Do	.....	.....	1887	17-19	10.43	.....	.....	.....	.....
Port Gibson	.....	.....	1887	18	2.99	.....	.....	.....	.....
University	.....	.....	1887	24	2.67	.....	.....	.....	.....
Vicksburg	.....	.....	1877	17-18	2.97	1879	2	0 55	1.25
Do	.....	.....	1880	4	2.71	.....	.....	.....	.....
Do	.....	.....	1881	27-28	6.59	.....	.....	.....	.....
Missouri.									
Carthage	1883	11.76	.....	.....	.....	.....	.....	.....	.....
Hannibal	1881	10.70	.....	.....	.....	.....	.....	.....	.....
Independence	.....	.....	1879	11	2.72	.....	.....	.....	.....
Kansas City	.....	.....	1877	19	2.61	1888	4	1 40	2.00
Do	.....	.....	1888	4-5	2.98	.....	.....	.....	.....
Kirksville	1881	11.30	.....	.....	.....	.....	.....	.....	.....
Lexington	.....	.....	1880	13	4.32	.....	.....	.....	.....
Do	.....	.....	1881	1	3.83	.....	.....	.....	.....
Saint Joseph	1881	11.24	1881	12	3.63	.....	.....	.....	.....
Do	.....	.....	1881	17	3.60	.....	.....	.....	.....
Saint Louis	.....	.....	1847	21	4.55	1854	12	1 15	1.35
Do	.....	.....	1858	24	2.95	.....	.....	.....	.....
Do	.....	.....	1885	18-19	3.14	.....	.....	.....	.....
Montana.									
Fort Missoula	1882	4.07	.....	.....	.....	.....	.....	.....	.....
Nebraska.									
Brownsville	.....	.....	1886	22	2.87	.....	.....	.....	.....
Fort Robinson	1887	8.60	1887	23	7.07	1887	23	5 30	7.07
Howard	.....	.....	1885	10	2.50	1850	13	0 50	1.38
Omaha	.....	.....	1872	28-29	3.46	.....	.....	.....	.....
Do	.....	.....	1883	16-17	2.72	.....	.....	.....	.....
Do	.....	.....	1884	3-4	3.66	.....	.....	.....	.....
Omaha Barracks	.....	.....	.....	.....	.....	1870	17	1 30	2.00
Nevada.									
Winnemucca	1882	1.76	.....	.....	.....	.....	.....	.....	.....

Table showing for the month of October, &c.—Continued.

States and stations.	Rainfall of 10 inches, or more, per month.		Rainfall of 2.50 inches, or more, in 24 hours.			Rainfall equaling or exceeding one inch per hour.			
	Year.	Amt.	Year.	Day.	Amt.	Year.	Day.	Time.	Amt.
New Hampshire.		*Inches.*			*Inches*			*h. m.*	*Inches*
Antrim	.....	.....	1880	30-31	2.70	.....	.....	.....	.....
Auburn	1877	13.15	.....	.....	.....	.....	.....	.....	.....
Concord	1855	11.00	.....	.....	.....	.....	.....	.....	.....
Dunbarton	1869	12.83	.....	.....	.....	.....	.....	.....	.....
Hanover	.....	.....	1843	8	2.95	.....	.....	.....	.....
Do	.....	.....	1844	3-4	2.85	.....	.....	.....	.....
Do	.....	.....	1869	3-4	5.88	.....	.....	.....	.....
North Conway	.....	.....	1888	7	3.28	.....	.....	.....	.....
Lake Village	1869	11.34	.....	.....	.....	.....	.....	.....	.....
Mount Washington	1881	18.38	1881	15	2.87	.....	.....	.....	.....
Do	1884	12.91	.....	.....	.....	.....	.....	.....	.....
Do	1885	11.11	.....	.....	.....	.....	.....	.....	.....
Shelburne	1873	12.95	.....	.....	.....	.....	.....	.....	.....
Weir's Bridge	1869	11.80	.....	.....	.....	.....	.....	.....	.....
New Jersey.									
Atlantic City	.....	.....	1883	23-24	3.36	.....	.....	.....	.....
Do	.....	.....	1886	29-30	6.02	.....	.....	.....	.....
Barnegat City	.....	.....	1877	9	2.83	.....	.....	.....	.....
Belvidere	.....	.....	1883	29	2.66	.....	.....	.....	.....
Cape May	1883	8.63	.....	.....	.....	.....	.....	.....	.....
Hopewell	.....	.....	1888	1	2.50	.....	.....	.....	.....
Lakewood	.....	.....	1887	21	2.86	.....	.....	.....	.....
New Brunswick	.....	.....	1888	6	2.74	.....	.....	.....	.....
Oceanic	.....	.....	1887	21	3.52	.....	.....	.....	.....
Sandy Hook	.....	.....	1877	4	3.26	.....	.....	.....	.....
Do	.....	.....	1886	27	3.88	.....	.....	.....	.....
New Mexico.									
Fort Selden	.....	.....	1888	19	3.81	.....	.....	.....	.....
Santa Fé	1881	4.19	.....	.....	.....	.....	.....	.....	.....
New York.									
Ardenia	.....	.....	1866	29-30	5.03	.....	.....	.....	.....
Buffalo	.....	.....	1881	2	3.10	.....	.....	.....	.....
Flushing	.....	.....	1877	4	4.75	.....	.....	.....	.....
Fort Hamilton	.....	.....	1869	3	2.60	.....	.....	.....	.....
Do	.....	.....	1877	4-5	4.90	.....	.....	.....	.....
Monticello	.....	.....	1886	22-23	2.59	.....	.....	.....	.....
Moriches	.....	.....	1875	6-7	3.00	.....	.....	.....	.....
Do	.....	.....	1877	4	3.90	.....	.....	.....	.....
Do	.....	.....	1877	9	2.92	.....	.....	.....	.....
New York City	.....	.....	1873	20	3.01	1877	4	1 00	1.50
Do	.....	.....	1877	6-7	4.32	.....	.....	.....	.....
Do	.....	.....	1877	4	4.05	.....	.....	.....	.....
Do	.....	.....	1886	26-27	2.75	.....	.....	.....	.....
Oswego	.....	.....	1878	23	2.68	.....	.....	.....	.....
Pelham Manor	1877	10.43	1877	4	5.02	.....	.....	.....	.....
Do	.....	.....	1877	8-9	3.26	.....	.....	.....	.....
Rochester	.....	.....	1873	20	3.77	.....	.....	.....	.....
Setauket	.....	.....	1885	3	2.59	.....	.....	.....	.....
Troy	1869	13.80	.....	.....	.....	.....	.....	.....	.....
West Point	.....	.....	1877	4	2.68	.....	.....	.....	.....
White Plains	1877	18.09	1877	8-9	9.70	.....	.....	.....	.....
North Carolina.									
Asheville	.....	.....	1879	17-18	6.40	1879	17-8	4 00	6.40
Cape Lookout	.....	.....	1878	11	3.30	.....	.....	.....	.....
Do	.....	.....	1878	22	4.06	.....	.....	.....	.....
Do	.....	.....	1880	9	3.82	.....	.....	.....	.....
Charlotte	.....	.....	1882	19-20	2.64	.....	.....	.....	.....
Do	.....	.....	1885	12	2.82	.....	.....	.....	.....
Do	.....	.....	1888	10-11	2.58	.....	.....	.....	.....
Chapel Hill	1887	11.21	.....	.....	.....	.....	.....	.....	.....
Elsworth	.....	.....	1880	28-29	6.30	.....	.....	.....	.....
Flat Rock	1885	12.85	1885	28	3.84	.....	.....	.....	.....
Do	.....	.....	1885	12	4.11	.....	.....	.....	.....
Fort Macon	.....	.....	1882	11-12	5.26	.....	.....	.....	.....
Do	.....	.....	1885	12	2.63	.....	.....	.....	.....
Franklin	1879	11.40	1879	16-18	7.00	.....	.....	.....	.....
Goldsborough	.....	.....	1885	12	2.95	.....	.....	.....	.....
Do	.....	.....	1887	31	2.75	.....	.....	.....	.....
Hatteras	1880	12.00	1875	14	5.30	.....	.....	.....	.....
Do	1885	10.28	1876	20-21	5.45	1876	20	2 15	2.86
Do	1887	11.07	1878	11	3.95	1882	11	2 00	2.05
Do	.....	.....	1878	22	3.16	.....	.....	.....	.....
Do	.....	.....	1879	28	3.13	.....	.....	.....	.....
Do	.....	.....	1880	9	4.40	.....	.....	.....	.....
Do	.....	.....	1882	11	4.66	.....	.....	.....	.....
Do	.....	.....	1885	28-29	3.47	.....	.....	.....	.....
Do	.....	.....	1887	30-31	3.94	.....	.....	.....	.....
Highlands	1879	15.83	1879	17-20	11.59	.....	.....	.....	.....
Do	1881	10.83	1881	29-30	8.27	.....	.....	.....	.....
Lincolnton	.....	.....	1885	20	2.50	.....	.....	.....	.....
Lumberton	.....	.....	1885	12	3.73	.....	.....	.....	.....
Do	.....	.....	1887	18	4.20	.....	.....	.....	.....
Murphy	.....	.....	1879	16-18	4.30	.....	.....	.....	.....
New River Inlet	.....	.....	1885	12	2.98	.....	.....	.....	.....
Do	.....	.....	1885	29	2.87	.....	.....	.....	.....
Portsmouth	.....	.....	1878	11	3.26	.....	.....	.....	.....
Do	.....	.....	1878	22	3.48	.....	.....	.....	.....
Do	.....	.....	1882	11-12	5.70	.....	.....	.....	.....
Do	.....	.....	1883	29	2.50	.....	.....	.....	.....
Raleigh	.....	.....	1885	12	2.75	.....	.....	.....	.....
Do	1887	10.23	1887	31-1[a]	4.52	.....	.....	.....	.....
Reidsville	1885	29.09?	1885	2	4.00?	1885	20	4 30	6.00?
Do	.....	.....	1885	11	4.00?	.....	.....	.....	.....
Do	.....	.....	1885	19	4.06?	.....	.....	.....	.....
Do	.....	.....	1885	20	6.00?	.....	.....	.....	.....
Do	.....	.....	1885	28	6.00?	.....	.....	.....	.....
Salisbury	1881	14.19	.....	.....	.....	.....	.....	.....	.....
Southport	1876	10.05	1876	22	3.90	.....	.....	.....	.....
Do	.....	.....	1878	11	2.67	.....	.....	.....	.....
Do	.....	.....	1878	22	4.39	.....	.....	.....	.....
Do	.....	.....	1880	29	2.51	.....	.....	.....	.....

Table showing for the month of October, &c.—Continued.

States and stations.	Rainfall of 10 inches, or more, per month.		Rainfall of 2.50 inches, or more, in 24 hours.			Rainfall equaling or exceeding one inch per hour.			
	Year.	Amt.	Year.	Day.	Amt.	Year.	Day.	Time.	Amt.
North Carolina—Continued.		*Inches.*			*Inches*			h. m.	*Inches*
Southport	.....	.....	1882	11-12	7.38	.....	....	.....	.....
Statesville	.....	.....	1888	10-11	2.02	.....	....	.....	.....
Webster	.....	.....	1879	16-18	6.70	.....	....	.....	.....
Weldon	.....	.....	1887	30-31	3.41	.....	....	.....	.....
Wilmington	.....	.....	1872	23	2.77	.....	....	.....	.....
Do	.....	.....	1876	19	3.80	.....	....	.....	.....
Do	.....	.....	1878	23	3.16	.....	....	.....	.....
Do	.....	.....	1880	29	2.76	.....	....	.....	.....
Do	.....	.....	1882	10	4.20	.....	....	.....	.....
Do	.....	.....	1885	11	4.51	.....	....	.....	.....
Do	.....	.....	1888	10-11	2.84	.....	....	.....	.....
Ohio.									
Cincinnati	.....	.....	1876	22-23	2.64	.....	....	.....	.....
Do	.....	.....	1883	28-29	3.06	.....	....	.....	.....
Columbus	.....	.....	1881	1-2	3.49	.....	....	.....	.....
Portsmouth	.....	.....	1837	26	2.90	.....	....	.....	.....
Toledo	.....	.....	1881	2	3.10	1881	8	1 26	1.52
West Milton	1888	10.00	1888	18	3.00	.....	....	.....	.....
Oregon.									
Astoria	1875	13.38	1875	20	3.33	.....	....	.....	.....
Do	1876	14.20	1875	30	2.63	.....	....	.....	.....
Bandon	.....	.....	1886	14	2.65	.....	....	.....	.....
Fort Stevens	1875	14.13	.....	.....	.....	.....	....	.....	.....
Do	1876	11.66	.....	.....	.....	.....	....	.....	.....
Do	1881	11.59	.....	.....	.....	.....	....	.....	.....
Do	1882	10.98	.....	.....	.....	.....	....	.....	.....
Portland	1876	10.53	.....	.....	.....	.....	....	.....	.....
Do	1882	11.63	1882	9-10	2.93	.....	....	.....	.....
Pennsylvania.									
Blooming Grove	.....	.....	1881	2	2.90	.....	....	.....	.....
Do	.....	.....	1885	20	3.10	.....	....	.....	.....
Carlisle	1863	13.10	1863	16	3.80	.....	....	.....	.....
Do	.....	.....	1863	23-24	3.00	.....	....	.....	.....
Do	.....	.....	1866	13	2.60	.....	....	.....	.....
Do	.....	.....	1878	22-23	4.00	.....	....	.....	.....
Hulmeville	.....	.....	1877	4	3.60	.....	....	.....	.....
Mahanoy Plane	.....	.....	1885	21	2.60	.....	....	.....	.....
Mount Pleasant	.....	.....	1884	6-7	2.90	.....	....	.....	.....
Newtown	.....	.....	1540	29	2.64	.....	....	.....	.....
Philadelphia	1833	10.05	1872	25-26	3.70	.....	....	.....	.....
Do	.....	.....	1873	19-20	3.14	.....	....	.....	.....
Do	.....	.....	1877	4	2.73	.....	....	.....	.....
Troy	.....	.....	1885	21	3.17	.....	....	.....	.....
Wellsborough	.....	.....	1888	5-6	2.98	.....	....	.....	.....
West Chester	.....	.....	1877	4	5.00	.....	....	.....	.....
Williamsport	.....	.....	1877	4	2.95	.....	....	.....	.....
Wysox	.....	.....	1885	20	3.00	.....	....	.....	.....
Rhode Island.									
Block Island	.....	.....	1880	22-23	2.96	.....	....	.....	.....
Do	.....	.....	1883	23-24	2.67	.....	....	.....	.....
Do	.....	.....	1885	13-14	2.62	.....	....	.....	.....
Fort Adams	.....	.....	1870	20	2.50	.....	....	.....	.....
Do	.....	.....	1877	5-6	2.90	.....	....	.....	.....
Narragansett	1863	8.14	.....	.....	.....	.....	....	.....	.....
Newport	.....	.....	1878	12	3.11	.....	....	.....	.....
Do	.....	.....	1878	13	3.31	.....	....	.....	.....
Do	.....	.....	1882	14	2.95	.....	....	.....	.....
South Carolina.									
Allendale	.....	.....	1887	20	3.35	.....	....	.....	.....
Blackville	.....	.....	1887	20	3.34	.....	....	.....	.....
Cedar Springs	.....	.....	1888	27	2.55	.....	....	.....	.....
Charleston	1876	14.32	1872	22-23	3.43	1879	11	0 30	1.00
Do	.....	.....	1876	20	6.15	.....	....	.....	.....
Do	.....	.....	1880	8	3.75	.....	....	.....	.....
Do	.....	.....	1882	11-12	4.17	.....	....	.....	.....
Do	.....	.....	1885	11-12	5.00	.....	....	.....	.....
Cheraw	1887	10.11	1887	18	3.00	.....	....	.....	.....
Columbia	.....	.....	1887	17-18	2.77	.....	....	.....	.....
Florence	.....	.....	1887	18	2.97	.....	....	.....	.....
Hilton Head	.....	.....	1862	9	2.85	.....	....	.....	.....
Jacksonborough	.....	.....	1882	21	3.00	.....	....	.....	.....
Do	.....	.....	1885	11	3.50	.....	....	.....	.....
Kirkwood	.....	.....	1887	17	2.54	.....	....	.....	.....
Saint Matthews	.....	.....	1887	20	2.68	.....	....	.....	.....
Statesburgh	.....	.....	1887	17-18	2.50	.....	....	.....	.....
Tennessee.									
Bolivar	1883	12.09	.....	.....	.....	.....	....	.....	.....
Brownsville	.....	.....	1883	18	3.03	.....	....	.....	.....
Chattanooga	.....	.....	1888	25-26	2.51	.....	....	.....	.....
Fostoria	.....	.....	1886	26	3.00	.....	....	.....	.....
Grand Junction	.....	.....	1883	29	5.00	.....	....	.....	.....
Knoxville	.....	.....	1885	28-29	2.89	.....	....	.....	.....
Memphis	.....	.....	1883	3-4	4.33	.....	....	.....	.....
Paris	.....	.....	1884	1	2.88	.....	....	.....	.....
Trenton	1883	12.83	.....	.....	.....	.....	....	.....	.....
Texas.									
Abilene	.....	.....	.....	.....	.....	1885	24	0 25	1.50
Austin	1870	12.44	1870	15-18	12.28	.....	....	.....	.....
Do	.....	.....	1888	21	4.00	.....	....	.....	.....
Barnesville	.....	.....	1883	12	2.50	.....	....	.....	.....
Belmont Farm	1877	12.00	1871	?	3.00	.....	....	.....	.....
Do	.....	.....	1879	2-3	4.50	.....	....	.....	.....
Brenham	.....	.....	1887	24	2.75	.....	....	.....	.....
Brownsville	1884	15.71	1877	17	3.08	.....	....	.....	.....
Do	1887	10.97	1879	26-27	2.58	1877	17	2 10	2.28
Do	.....	.....	1884	23	3.09	1884	23	0 06	1.20
Do	.....	.....	1884	24	3.54	.....	....	.....	.....
Do	.....	.....	1884	27-28	4.86	.....	....	.....	.....

Table showing for the month of October, &c.—Continued.

States and stations.	Rainfall of 10 inches, or more, per month.		Rainfall of 2.50 inches, or more, in 24 hours.			Rainfall equaling or exceeding one inch per hour.			
	Year.	Amt.	Year.	Day.	Amt.	Year.	Day.	Time.	Amt.
Texas—Continued.		*Inches.*			*Inches*			h. m.	*Inches*
Brownsville	.....	.....	1885	8	4.31	.....	....	.....	.....
Do	.....	.....	1887	21	4.28	.....	....	.....	.....
Do	.....	.....	1887	10-11	6.09	.....	....	.....	.....
Brackettville	1881	16.17	1881	1-2	13.08	.....	....	.....	.....
Do	.....	.....	.....	.....	.....	1881	1-2	8 00	10.97
Clarksville	1883	10.13	1881	27	2.75	.....	....	.....	.....
Do	.....	.....	1883	10	3.25	1883	9	1 10	1.51
Corsicana	.....	.....	1887	8	2.50	.....	....	.....	.....
Cuero	.....	.....	1887	8	3.60	.....	....	.....	.....
Dallas	.....	.....	1882	16	4.05	.....	....	.....	.....
Denison	1877	10.74	1877	14	4.00	.....	....	.....	.....
Do	.....	.....	1881	1	2.82	.....	....	.....	.....
Eagle Pass	.....	.....	1881	1	3.18	.....	....	.....	.....
Edinburg	1881	10.54	.....	.....	.....	.....	....	.....	.....
Fort Brown	1884	10.17	1871	26	3.60	.....	....	.....	.....
Do	.....	.....	1879	26-27	2.85	1871	26	3 00	3.60
Do	.....	.....	1884	26-27	5.00	.....	....	.....	.....
Do	.....	.....	1885	10	5.65	.....	....	.....	.....
Fort Concho	.....	.....	.....	.....	.....	1883	4	1 30	2.26
Fort Davis	.....	.....	1879	10-11	3.86	.....	....	.....	.....
Do	.....	.....	1881	9	2.82	.....	....	.....	.....
Fort Elliott	.....	.....	1883	16-17	2.62	.....	....	.....	.....
Do	.....	.....	1880	20-21	2.97	1882	2	1 00	1.40
Galveston	1871	17.78	1871	2	7.77	1877	30	0 25	2.12
Do	1877	17.39	1871	29-30	7.92	.....	....	.....	.....
Do	1881	10.38	1877	24	5.53	.....	....	.....	.....
Do	.....	.....	1877	25	3.99	.....	....	.....	.....
Do	.....	.....	1878	26	2.93	.....	....	.....	.....
Do	.....	.....	1881	23	3.04	.....	....	.....	.....
Do	.....	.....	1882	18	3.59	.....	....	.....	.....
Do	.....	.....	1883	24	4.17	.....	....	.....	.....
Do	.....	.....	1884	25-26	5.12	.....	....	.....	.....
Do	.....	.....	1887	18	3.21	.....	....	.....	.....
Do	.....	.....	1888	22	3.04	.....	....	.....	.....
Houston	.....	.....	1884	26	3.16	.....	....	.....	.....
Indianola	1877	11.75	1877	16	4.11	.....	....	.....	.....
Do	.....	.....	1877	30	3.24	.....	....	.....	.....
Do	.....	.....	1879	3	4.71	.....	....	.....	.....
Jacksborough	.....	.....	1880	2	4.12	.....	....	.....	.....
Laredo	.....	.....	1881	8	3.53	.....	....	.....	.....
Longview	1885	10.23	1885	18	3.97	.....	....	.....	.....
Do	.....	.....	1885	25-26	6.10	.....	....	.....	.....
Do	.....	.....	1887	24	2.60	.....	....	.....	.....
Mesquite	.....	.....	1871	.....	3.50	.....	....	.....	.....
New Ulm	1877	11.31	1888	21	2.51	1879	2	1 05	2.38
Do	1881	12.44	.....	.....	.....	.....	....	.....	.....
Orange	.....	.....	1887	18	3.75	.....	....	.....	.....
Palestine	.....	.....	1882	17-18	4.59	.....	....	.....	.....
Do	.....	.....	1887	24	2.60	.....	....	.....	.....
Pilot Point	1877	10.42	.....	.....	.....	.....	....	.....	.....
Rio Grande City	.....	.....	.....	.....	.....	1879	1	0 35	1.24
San Antonio	.....	.....	1883	24	2.96	1882	8	1 10	1.70
Sour Lake	.....	.....	1886	13	6.80	.....	....	.....	.....
Do	.....	.....	1888	22	3.00	.....	....	.....	.....
Utah.									
Kanab	.....	.....	1876	13	2.50	.....	....	.....	.....
Salt Lake City	1876	3.27	.....	.....	.....	.....	....	.....	.....
Vermont.									
Charlotte	1869	11.40	.....	.....	.....	.....	....	.....	.....
Craftsbury	1869	10.72	.....	.....	.....	.....	....	.....	.....
Newport	.....	.....	1885	21	3.11	.....	....	.....	.....
Strafford	.....	.....	1885	21	2.60	.....	....	.....	.....
Virginia.									
Accotink	.....	.....	1877	4	4.00	.....	....	.....	.....
Cape Henry	.....	.....	1882	24	2.68	.....	....	.....	.....
Dale Enterprise	1885	12.60	1885	12	3.14	.....	....	.....	.....
Do	.....	.....	1885	20-21	2.88	.....	....	.....	.....
Do	.....	.....	1885	28-29	4.75	.....	....	.....	.....
Dover Mines	.....	.....	1878	22-23	3.80	.....	....	.....	.....
Fort Monroe	.....	.....	1860	20	3.50	.....	....	.....	.....
Fort Myer	.....	.....	1877	4	4.30	.....	....	.....	.....
Keswick	.....	.....	1878	23	3.50	.....	....	.....	.....
Lynchburgh	.....	.....	1877	3	5.43	.....	....	.....	.....
Do	.....	.....	1885	29	2.77	.....	....	.....	.....
Mount Solon	.....	.....	1877	3-4	3.50	.....	....	.....	.....
Norfolk	.....	.....	1872	23-24	3.77	.....	....	.....	.....
Do	.....	.....	1872	24-25	3.62	.....	....	.....	.....
Do	.....	.....	1878	22-23	3.31	.....	....	.....	.....
Variety Mills	1885	10.76	1885	12-13	4.00	.....	....	.....	.....
Do	.....	.....	1885	28-29	4.02	.....	....	.....	.....
Woodlawn	.....	.....	1877	4	4.00	.....	....	.....	.....
Do	.....	.....	1878	22-23	2.50	.....	....	.....	.....
Wytheville	.....	.....	1886	27	2.55	.....	....	.....	.....
Washington.									
Neah Bay	1884	10.65	.....	.....	.....	.....	....	.....	.....
Do	1887	14.84	1887	27	5.77	.....	....	.....	.....
Tatoosh Island	1887	11.83	1887	26-27	4.54	.....	....	.....	.....
Do	1888	12.12	1888	27-28	2.74	.....	....	.....	.....
West Virginia.									
Morgantown	1873	5.76	.....	.....	.....	.....	....	.....	.....
Wisconsin.									
Cadiz	.....	.....	1888	26	2.50	.....	....	.....	.....
Green Bay	.....	.....	1887	13-14	2.72	.....	....	.....	.....
Madison	1881	9.12	.....	.....	.....	.....	....	.....	.....
Wyoming.									
Cheyenne	1877	1.99	.....	.....	.....	.....	....	.....	.....

* November 1.

WINDS.

The most frequent directions of the wind during October, 1888, are shown on chart ii by arrows flying with the wind. On the Atlantic coast from Virginia northward the prevailing winds were northwest; on the south Atlantic and Florida coasts they were variable; on the east Gulf coast, northerly, and on the west Gulf coast, southerly. In the lower lake region south to west winds were most frequently noted; in the Ohio Valley they were variable; in Tennessee, north to west; in the Mississippi Valley, variable. Along the southern slope of the Rocky Mountains the winds were mostly southerly; over the middle slope, westerly; and over the northern slope, northwesterly. In the plateau regions the winds were generally westerly, while on the Pacific coast they were west to south on the southern slope, north to west on the middle slope, and south to southwest on the northern slope.

HIGH WINDS (in miles per hour).

No maximum velocities of fifty miles, or more, per hour, other than those given in the table of miscellaneous meteorological data, have been reported, except at Fort Buford, Dak., 54, nw., 18th, and at Tatoosh Island, Wash., 54, nw., 23d.

LOCAL STORMS.

1st. *Ohio.*—Newark: a severe wind and rain storm occurred in the afternoon, doing much damage to buildings and trees.

2d. *Georgia.*—Columbus: Mr. W. S. Kennedy, of this place, makes the following report through Mr. H. M. Ayer: "October 2d, a disturbance of great grandeur and awful force was observed in the cloud regions; its effect at the earth's surface being noticeable only as tremulous and jarring sounds resulting from heavy electrical discharges. The only portion of the horizon obscured was directly under the formation, where a pillar of lead color was encompassed by a massive cloud-bank of great density; to the left of which were dark-brownish, drab clouds. Above these were gray, billowy, curled, crumpled clouds, which seemed to be continually curling and rolling themselves into each other, and pushing closer towards the cylindrical shaft, which contracted near the centre and opened out like a funnel at the top, as if impelled by some great centrifugal force. The velocity of the wind within the cylinder I judged to be terrific. The height above ground of the disturbance was about 45°, and the distance from my point of observation one mile or more. The pillar assumed the hour-glass contraction, and seemed to tend upwards instead of downwards, as the opposing currents of air seemed to strike near the bottom of the formation, blend, and assume the twirl of an auger, and push for the contraction and towards the top. The motion of the pillar was something like the action of a balloon, ever upwards, and swaying from side to side. At times it seemed as if completely suspended and to lose its motion. What I should call the tail was composed of lights which streamed straight out for miles to the southward. A few drops of rain fell before and but little afterwards. The day opened clear and bright; towards noon the sky was hazy, and a heaviness and humidity was observable; about 3 p. m. clouds were seen congregating and drifting from northeast to west; about 3.30 p. m. (ninetieth meridian time) they were seen to assemble in the northwest and drift to west, being impelled by a brisk wind, and gaining momentum as they approached the place where they concentrated and formed the phenomenon above described. The formation was dispelled by a loud burst of thunder." *Ohio.*—Cedarville: a severe wind storm occurred about 5 p. m., unroofing buildings, blowing down trees, &c.

19th. *Maryland.*—Utica Mills: Mr. G. F. Mills reports: "This section was visited by a violent tornado, doing considerable damage eight miles south of this place; it unroofed houses, uprooted trees, and blew down fences. Direction of movement was from west to east; width of path of greatest destruction, 1,500 yards; width of storm twelve miles; rain commenced 6.05 p. m. and ended 6.20 p. m.; total fall, .50 inch. The storm was attended by electrical manifestations." *New York.*—Middletown: a destructive wind and rain storm, accompanied by vivid lightning, passed over this section about 5.45 p. m.; fencing, trees, and crops were much injured.

22d. *Louisiana.*—Whitney Plantation, Saint John Baptist Parish: Mr. G. H. Tassin reports: "At 4.35 a. m., New Orleans time, a storm swept the whole depth of this plantation (two miles), which is about fifty miles above New Orleans. It moved from south to northeast, and, on striking the Mississippi levee, ascended, and again struck the ground on the other side of the river. This was a very powerful and destructive disturbance, and although the width of the path did not appear to be over three hundred feet, two persons were probably fatally injured; two mules were killed by flying splinters, and out-buildings were demolished. No rain had fallen for thirty-two days previous to the storm, and during the week preceding it the weather had been very warm, the thermometer reaching 86° at 11 p. m. for three consecutive days. After the passage of the storm we had quite a severe hail storm, but the hail did not fall to the west of the path. Directly after the hail, rain poured down in heavy drops for twenty minutes, then it ceased to start again and continued to fall very heavily for about an hour. The storm kept almost all the débris within its path, more particularly on the west side, and it is not known what became of all the lumber that made up the buildings destoyed. Our loss, comprising stock, buildings, and hay crop, is not less than $3,000. The path of this storm was almost parallel with, and about five hundred feet distant from, that of the terrible storm of November 22, 1884."

WATER-SPOUTS.

Captain J. McFarlin, of the s. s. "Stroma," observed a water-spout October 7th, 4 p. m., in N. 39°, W. 68°, traveling from wnw. to ese., with wind from sse., force 8. Captain McIntosh, of the ship "Steinvora," reports a water-spout October 14th, 5 p. m., in N. 39°, W. 71°, moving slowly se., with wind nw. hauling to ne., and increasing from force 2 to force 7, and barometer steady. On the same day, at 5 p. m., Captain Blake, of the schr. "Cox and Green," observed a water-spout about twenty miles off Fire Island, moving sw., wind calm before, and ne. force 6 after, its appearance. Captain A. McKay, of the s. s. "Pavonia," reports a water-spout October 19th, 11.30 a. m., in N. 51°, W. 10°, moving w., with slowly rising barometer, and wind sse., force 6. Captain Chambers, of the brig "Bessie May," observed a water-spout October 22d, 2 p. m., in N. 32°, W. 74°, moving s., with wind ne., force 4. The captain of the s. s. "Aguan," reports a water-spout October 25th, 10.30 a. m., in N. 19°, W. 76°, moving wsw., with wind e., force 4.

Captain Legoe, of the s. s. "Pomona," reports water-spouts as follows: "October 16th, 6.15 a. m., Cape Morant Point, Jamaica, sw., eighty miles, saw a very large water-spout, traveling rapidly toward the wsw., about one-fourth of a mile from the ship. October 20th, 5 p. m., in N. 33° 47′, W. 74° 49′, saw a water-spout bearing nw., going to the ne., wind sw., squalls, with lightning and light rain; at 10 p. m. wind came out of nw. in heavy squalls."

INLAND NAVIGATION.

STAGE OF WATER IN RIVERS AND HARBORS.

Toledo, Ohio: 1st, during the high southwesterly wind in the morning, the water in the Maumee River fell rapidly, and many vessels were aground.

Nashville, Tenn.: navigation on the upper and lower Cumberland River is now practicable; the first large steamer made a trip up the river, and two large boats, the first ones of the season, came up from the Ohio River on the 23d.

Saint Paul, Minn.: the steamer "Mary Morton," from Saint Louis, Mo., arrived here and departed on the 26th. She is reported to be the last boat of the season.

In the following table are shown the danger-points at the various stations; the highest and lowest depths for October, 1888, with the dates of occurrence and the monthly ranges:

Heights of rivers above low-water mark, October, 1888 (in feet and tenths).

Stations.	Danger-point on gage.	Highest water.		Lowest water.		Monthly range.
		Date.	Height.	Date.	Height.	
Red River:						
Shreveport, La.....	29.9	1	6.3	31	1.0	5.3
Arkansas River:						
Fort Smith, Ark ...	22.0	1	1.7	19-21 and 25-27	1.1	0.6
Little Rock, Ark...	23.0	1	3.4	19, 23	1.4	1.0
Missouri River:						
Leavenw'rth, Kans.	20.0	1	6.6	31	5.5	1.1
Kansas City, Mo...	21.0	1	6.6	31	6.0	0.6
Mississippi River:						
Saint Paul, Minn...	14.5	30, 31	3.6	1	2.9	0.7
La Crosse, Wis	24.0	30, 31	3.8	11	3.3	0.5
Dubuque, Iowa	16.0	1, 2	3.4	14, 15	2.9	0.5
Davenport, Iowa...	15.0	22	2.2	8, 14	1.8	0.4
Keokuk, Iowa	14.0	1, 23, 24	1.8	13, 18	1.2	0.6
Saint Louis, Mo ...	32.0	1	6.0	18	5.0	1.0
Cairo, Ill	40.0	31	18.6	13, 16	5.0	13.6
Memphis, Tenn....	34.0	31	13.2	18, 19	4.8	7.4
Vicksburg, Miss*..	41.0	1	13.7	25	2.4	11.3
New Orleans, La ..	13.0	1	4.5	17-22 and 28-31	3.3	1.2
Ohio River:						
Pittsburgh, Pa.....	22.0	21	11.3	1	4.4	6.9
Parkersburg, W.Va.	36.0	30	16.0	1	3.7	12.3
Cincinnati, Ohio ...	50.0	30	33.0	5	6.9	26.1
Louisville, Ky.....	25.0	31	11.8	10	4.3	7.5
Cumberland River:						
Nashville, Tenn ...	40.0	31	16.0	13	1.4	14.6
Tennessee River:						
Chattanooga, Tenn .	33.0	28	30.0	8	2.8	17.2
Monongahela River:						
Pittsburgh, Pa.....	22.0	21	11.3	1	4.4	6.9
Savannah River:						
Augusta, Ga	32.0	27	30.9	23	7.9	13.0
Willamette River:						
Portland, Oregon ..	15.0	6	3.4	1	0.9	2.5

*For 25 days.

FLOODS.

Saint Paul, Minn., 5th: reports from Ramsey Co., Dak., state that the recent freshets have destroyed nearly all of the wheat crop in that county, and that, as a consequence, the inhabitants are in a destitute condition.

Bangor, Me., 8th: heavy rains since the 5th instant have caused freshets in this section. Oldtown, Penobscott Co., Me., 8th: heavy rains have caused the Kennebec River to rise, doing much damage to property and the lumber interests.

Calais, Washington Co., Me., 9th: the Saint Croix and Aroostook rivers are nearly at their high water marks; lumber mills and factories are being closed; timber is being carried away by the floods; railroads washed out, and crops damaged or ruined. Fairfield, Somerset Co., Me., 9th; great freshets prevail in this vicinity, causing much damage to mill property.

Saint John's, N. B., 10th: trains on the New Brunswick Railroad were delayed on the 8th by washouts resulting from the recent heavy rains. Reports from Fredericton state that four bridges crossing the Nashwaak River were swept away yesterday, together with 1,000,000 feet of logs. The water has caused great destruction to the hay and buckwheat crops in Queens and Carleton counties; barns were swept away and a number of saw mills flooded.

Los Angeles, Cal.: the following are extracts from the Los Angeles "Daily Herald" of October 19th and 20th, 1888: "A cloud burst of extraordinary violence is reported on the desert along the line of the Southern Pacific Railroad. The rain came down in a perfect torrent on the night of the 18th, causing big washouts between Gila Bend and Texas Hill, Ariz., and numerous, though not very large washouts, between Cactus and Salton, Cal. The water fell in almost a solid mass at times, over two inches being registered at one place inside of an hour."

HIGH TIDES.

Eastport, Me., 7th to 9th. Cedar Keys, Fla., 10th: on this date a storm of marked energy was central over the eastern part of the Gulf of Mexico. At 9.30 p. m. the wind veered from easterly to south, and the barometer stood at 29.22 (lowest during storm). At this hour the water was at low water mark, and by 10 p. m. had risen over nine feet, covering the streets in the lower part of the town, and floating off three large rafts of logs. Many people fled from their homes and were obliged to wade waist deep in water. No lives were lost, although a number of narrow escapes were reported. Total damage in the vicinity estimated at $5,000.

ATMOSPHERIC ELECTRICITY.

AURORAS.

Auroral displays were most freqently noted at stations in eastern Massachusetts, where they were observed on nine dates. They were observed south of the fortieth parallel on three dates, *i. e.*, in the Ohio Valley on the 1st and 30th, and in northwestern Kansas on the 31st. The most noteworthy display, which was observed from eastern New England to the upper Missouri valley and southward to the thirty-eighth parallel, occurred on the nights of the 30th and 31st. The passage of a storm-centre from Manitoba over the upper lake region during these dates occasioned more or less cloudiness over the northern part of the country, which doubtless prevented the display from being more generally observed.

At Saint Vincent, Minn., the northern sky was obscured until 11.30 p. m. of the 30th, when an aurora became visible, first as a faint, broad arch, which increased in brilliancy until 1.20 a. m. of the 31st. At this time its altitude was about 15° and azimuth 105°. The display continued until morning, and appeared as a faint auroral light at 8 p. m., 31st. At 9 p. m. the sky became obscured.

Huron, Dak.: an aurora was observed in the north from 10.30 p. m., 30th, until daybreak the following morning; the display, though faint, was very bright at times.

Grand Haven, Mich.: a faint aurora began 10.30 p. m., 30th, which extended from 135° to 260° of azimuth, and rose to a uniform altitude of 15°. Its light was nearly white and quite steady. There were no waves or flashes of light. It increased in brilliancy until 10.50 p. m., when it was almost obscured by a bank of cumulo-stratus clouds until 11.20 p. m., after which it gradually faded until it disappeared at 11.45 p. m.

Fort Buford, Dak.: an aurora was observed on the 11th; it was first observed at 11.55 p. m., and then consisted of streamers rising apparently from a dark base to an extreme height of about 60°. Owing to clouds in the northern sky the aurora could not be well observed. At 12.58 a. m., 12th, the sky began to clear and the aurora was then in the form of a well-defined arch, with a maximum altitude of about 30°, and of straw and white color. It extended from northwest to northeast, and rested on a well-defined dark base. It disappeared 2.10 a. m., 12th.

Auroras were observed during the month as follows: 1st, Olney, Ill.; Saint Vincent, Minn. 4th, Milton, Mass.; Saint Vincent, Minn. 10th, Gardiner and Orono, Me.; Newburyport, Mass.; Fort Assinaboine, Mont.; Plymouth, N. H. 11th, Huron, Dak.; East Berkshire, Gardiner, Mayfield, and Orono, Me.; Cambridge and Newburyport, Mass.; Nashua, N. H.; Lyons, N. Y. 15–16th, Milton, Mass. 19th, Pekin, Ill.; Milton, Mass. 21st, Saint Vincent, Minn.; South Canisteo, N. Y. 25–26th, Milton, Mass. 29th, Delavan, Wis. 30th, Huron, Kimball, and Webster, Dak.; Belvidere, Cedarville, Lake Forest, Oneida, Oswego, Riley, and Winnebago, Ill.; Butlerville, Ind.; Maquoketa and Osage, Iowa; Kent's Hill and Orono, Me.; Blue Hill Observatory, Cambridge, Fitchburg, Groton, Leicester, Milton, Newburyport, and Provincetown,

Mass.; Grand Haven, Lansing, Noble, and Pontiac, Mich.; Saint Vincent, Minn.; Hanover, N. H.; Beverly, Madison, Moorestown, and South Orange, N. J.; Garrettsville and Wauseon, Ohio; Chelsea, Vt. 31st, Webster, Dak.; Hampton, Iowa; Allison, Kans.; Mayfield, Me.; Traverse City, Mich.; Moorhead, Minn.; Hanover, N. H.

THUNDER-STORMS.

Thunder-storms were reported during the month, by states and territories, as follows: 1st, 18; 2d, 13; 3d, 1; 4th, 8; 5th, 8; 6th, 12; 7th, 5; 8th, 2; 9th, 7; 10th, 6; 11th, 4; 12th, 2; 14th, 7; 15th, 7; 16th, 12; 17th, 10; 18th, 14; 19th, 15; 20th, 6; 21st, 5; 22d, 3; 23d, 2; 24th, 1; 25th, 3; 26th, 10; 27th, 11; 28th, 2; 30th, 1; 31st, 9.

Thunder-storms were reported in the several states and territories, by days, as follows: Ala., 3; Ariz., 9; Ark., 4; Colo., 2; Conn., 3; Dak., 4; Fla., 8; Ga., 3; Ill., 13; Ind., 5; Ind. T., 4; Iowa, 12; Kans., 10; Ky., 2; La., 9; Me., 1; Md., 4; Mass., 4; Mich., 8; Minn., 1; Miss., 2; Mo., 7; Mont., 1; Nebr., 3; Nev., 1; N. H., 2; N. J., 4; N. Y., 5; N. C., 2; Ohio, 11; Oregon, 1; Pa., 7; S. C., 8; Tenn., 9; Tex., 11; Utah, 1; Vt., 1; Va., 5; Wash., 2; W. Va., 3; Wis., 8.

Thunder-storms were reported in the greatest number of states and territories (18) on the 1st. On the 2d, 6th, 16th to 19th, 26th, and 27th they were noted in from ten to fifteen. On the 13th and 29th no thunder-storms were reported, and on the 3d, 7th, 8th, 11th, 12th, 21st to 25th, 28th, and 30th they were reported in five or less states or territories.

They were reported on the greatest number of days (13) in Ill., with a total of 106 reporting stations. In Iowa (50 stations), Ohio (44 stations), Tex. (24 stations), and Kans. (40 stations) they were noted on from ten to thirteen days. In Cal., Del., D. C., Idaho, N. Mex., and R. I. no thunder-storms were reported, and in Ala., Ark., Colo., Conn., Dak., Ga., Ind., Ind. T., Ky., Me., Md., Mass., Minn., Miss., Mont., Nev., N. C., Oregon, Utah, Vt., Wash., and W. Va. they were noted on from one to five days.

MISCELLANEOUS PHENOMENA.

DROUGHT.

Bismarck, Dak., 10th: The weather is very dry, and no rain has fallen since the 19th of last month.

Woonsocket, Dak., 31st: owing to the very dry weather plowing has been delayed to a greater extent than before during the last eight years.

Cedar Rapids, Iowa: the rainfall during the month has not been sufficient to keep the streams at their normal condition. Farmers in many places are complaining of lack of water in streams and wells.

FOREST AND PRAIRIE FIRES.

Jamestown, Dak., 4th: prairie fires were dangerously near Elbridge, ten miles west from here.

Bismarck, Dak., 9th: large prairie fires were observed several miles from this place; they were also observed to the south on the 29th and 30th.

Fort Totten, Dak., 9th: large prairie fires raged west of this place. A considerable amount of hay and grain and two farm houses were consumed. The fires moved southwest. Fires occurred on the 22d and spread rapidly over an area of seven miles northwest until they reached Devil's Lake.

Mandan, Dak., 11th: prairie fires, driven by a strong gale, threatened this town last night. The people turned out to fight the fire, and fire-breaks two hundred feet wide were made in all directions.

San Francisco, Cal., 24th: reports show that forest fires raged in Santa Cruz and San Joaquin counties, and that great damage was done to the fruit ranches and wheat.

Fort Sully, Dak., 28th: the whole western sky to an altitude of 30° was lighted up by prairie fires on the Sioux Indian reservation; prairie fires were also observed to the south and southwest of this station during the last four days of the month.

Fort Yates, Dak., 31st: one of the largest prairie fires ever known in this locality swept over the country opposite here, east of the Missouri River, in the evening. The town of Winona was only saved by the persevering efforts of its inhabitants.

Forest and prairie fires also occurred on the following dates: Fort Bidwell, Cal., 6th; Red Bluff, Cal., 14th, 24th; Fort Buford, Dak., 1st to 3d; Yankton, Dak., 30th; Fort Sill, Ind. T., 2d to 4th, 18th, 25th to 31st; Fort Assinaboine, Mont., 2d; Fort Elliott, Tex., 11th to 14th.

HALOS.

Solar halos were most frequently reported in Michigan and Tennessee, where they occurred on eight days. In Illinois, Oregon, and Pennsylvania they were noted on seven days, and in Maryland, New York, and Virginia on six days. No solar halos were reported in Connecticut, Delaware, District of Columbia, South Carolina, West Virginia, and Alabama, nor in the Rocky Mountain regions, except in Nevada and Montana, where they were noted on one and two days, respectively. In California a solar halo was observed on one day. The days of their most frequent occurrence were the 11th and 21st, when they were reported in ten states and territories; on the 22d, in nine; and on the 10th, in eight. On the 2d, 6th, 13th, and 28th no solar halos were reported.

Lunar halos were most frequently reported in Illinois, where they occurred on fourteen dates, in Michigan on ten, in Kansas on nine, and in Tennessee on eight. No lunar halos were reported in Alabama, Connecticut, Delaware, District of Columbia, Louisiana, and Rhode Island. In the plateau regions of the Rocky Mountains they were noted on from one to six dates, and on the Pacific coast on from four to seven dates. In the central valleys west of the Mississippi they occurred on from three to nine dates. They were most frequently reported on the 15th, when they occurred in sixteen states and territories; on the 17th, in fifteen; on the 18th, in thirteen; and on the 16th, in twelve. On the 1st, 2d, 3d, 5th, 6th, 7th, and 28th no lunar halos were reported.

METEORS.

The distribution of meteors, by dates, over the country was as follows:

3d, Fort Sully, Dak., Pekin, Ill. 4th, Kalamazoo, Mich., Clayton and Egg Harbor City, N. J. 6th, Fort Sully, Dak., Cedar Keys, Fla., Cedar Springs, S. C. 7th, Egg Harbor City, N. J., Marion, Va. 8th, Charleston, Ill., Fox Creek, Mo. 16th, Culbertson, Nebr. 17th, Vevay, Ind. 20th, Palestine, Ill., Cedar Springs, S. C. 25th, Pontiac, Mich. 26th, New Westminister, B. C., Strafford, Vt. 27th, Duck, Ga., Kalamazoo, Mich., Riddleton, Tenn., Mesquite, Tex. 28th, Egg Harbor City, N. J., Cleburne, Tex. 29th, Duke, Fla., Kalamazoo, Mich. 30th, Egg Harbor City, N. J., Utica, N. Y. 31st, Duke, Fla., Wakefield, Kans., Tecumseh, Nebr., Egg Harbor City, N. J., Fox Creek, Mo.

The following are additional and more notable meteoric displays reported:

Vevay, Switzerland Co., Ind.: a large meteor was observed at 5.55 p. m., 17th, at about 40° above the eastern horizon, and moving eastward; it was separated in a brilliant train which was visible eight or ten seconds.

Duck, Union Co., Ga.: a very brilliant meteor was observed at 11.15 p. m., 30th; it started in the east at an altitude of 45°, and moved in a southwesterly direction. The meteor was followed by a luminous trail which lasted about five seconds. Several small meteors were also observed during night of 30th.

MIRAGE.

San Diego, Cal.: the Lakeside hotel, trees, and a small

lake, distant twenty miles from this place, were distinctly seen on the 17th; the phenomenon lasted thirty minutes.

Mirage were also observed as follows: Yuma, Ariz., 3d, 10th; Fort Bidwell, Cal., 2d; San Diego, Cal., 17th; Webster, Dak., 2d, 3d, 5th, 6th, 8th, 13th, 29th; Woonsocket, Dak., 7th, 10th; Lake Forest, Ill., 30th; Hampton, Iowa, 10th, 11th; Marquette, Nebr., 4th, 8th, 29th to 31st; Green Bay, Wis., 7th.

SAND STORMS.

Sand storms were reported as follows:

San Carlos, Ariz., 18th, 19th; Dodge City, Kans., 18th, 31st; Keeler, Cal., 21st.

SUN SPOTS.

Sun spots were observed during the month as follows:

Mr. John W. James, Riley, McHenry Co., Ill.: reports that no sun spots were visible during the month.

Mr. H. D. Gowey, North Lewisburgh, Champaign Co., Ohio: the sun spots observed on the 25th were the only ones seen during the month.

Mr. M. A. Veeder, Lyons, Wayne Co., N. Y.: 2d, faculæ appeared by rotation; 24th, spots formed west of sun's meridian.

Prof. F. P. Leavenworth, director, Haverford College Observatory, Pa. (observed by Mr. H. V. Gummere, assistant):

Date. October, 1888.	Number of new—		Disappeared by solar rotation.		Reappeared by solar rotation.		Total number visible.		Faculæ.		Remarks.
	Groups.	Spots.	Groups.	Spots.	Groups.	Spots.	Groups.	Spots.	Groups.	Spots.	
1, 4 p. m	0	0	1	1	0	0	0	0	....	....	
2*	0	0	0	0	0	0	0	0	....	....	Through clouds.
3, 10 a. m	1	1	0	0	1	1	1	1	....	....	
4, 3 p. m	0	0	0	0	0	0	0	0	....	....	Definition very poor.
5, 4 p. m	0	0	0	0	0	0	0	0	....	....	
8, 3 p. m	0	0	0	0	0	0	0	0	....	....	
9, 9 a. m	0	0	0	0	0	0	0	0	....	....	Definition poor.
10, 4 p. m	0	0	0	0	0	0	0	0	....	....	
13, 11 a. m	0	0	0	0	0	0	0	0	....	....	Definition good.
15, 9 a. m	0	0	0	0	0	0	0	0	....	....	Definition poor.
16	0	0	0	0	0	0	0	0	....	....	Do.
17, 9 a. m	0	0	0	0	0	0	0	0	....	....	Definition good.
20, 9 a. m	1	2	0	0	1	2	1	2	....	....	Definition very good; faint.
24, 10 a. m	0	0	0	0	0	0	0	0	1	5	Definition poor.
25, 4 p. m*	2	17	0	0	0	0	2	17	2	2	Definition very good.
29, 10 a. m	0	0	0	0	0	0	1	3	0	0	Definition good.
30, 10 a. m	0	0	0	0	0	0	1	1	0	0	Definition very poor.
31, 10 a. m	0	0	1	1	0	0	0	0	0	0	Definition good.

*Observed by Prof. F. P. Leavenworth.

VERIFICATIONS.

INDICATIONS FOR 24 HOURS IN ADVANCE.

The percentages of verifications of the 8 p. m. daily indications for October, 1888, as determined from comparison of succeeding telegraphic reports, are given in the table below.

The predictions for districts east of the Rocky Mountains for October, 1888, were made by Professor Cleveland Abbe, and those for the Pacific Coast districts were made at San Francisco, Cal., by 2d Lieutenant J. E. Maxfield, Signal Corps; the verifications for all districts were determined by Assistant Professor C. F. Marvin.

Percentages of indications verified, October, 1888.

States.		States.	
Maine	76.3	Tennessee	74.0
New Hampshire	75.8	Kentucky	76.9
Vermont	73.9	Ohio	67.0
Massachusetts	75.5	West Virginia	68.2
Rhode Island	77.4	Indiana	74.8
Connecticut	78.2	Illinois	75.1
Eastern New York	75.5	Lower Michigan	76.5
Western New York	73.0	Upper Michigan	74.5
Eastern Pennsylvania	74.6	Wisconsin	73.2
Western Pennsylvania	67.5	Minnesota	71.9
New Jersey	77.3	Iowa	74.4
Delaware	76.1	Kansas	71.7
Maryland	74.8	Nebraska	76.1
District of Columbia	77.0	Missouri	78.8
Virginia	78.0	Colorado	71.0
North Carolina	83.0	Eastern Dakota	74.2
South Carolina	85.7	Southern California*	93.7
Georgia	84.3	Northern California*	91.9
Eastern Florida	76.0	Oregon*	78.1
Western Florida	74.8	Washington Territory*	77.9
Alabama	80.6	*By elements:* Weather	80.5
Mississippi	78.1	Temperature	68.4
Louisiana	74.5	Monthly percentage of weather and temperature combined†	75.7
Texas	77.3		
Arkansas	78.8		

*In determining the general percentage for the different elements the Pacific coast states are not included. †The monthly percentage of weather and temperature combined is determined by multiplying the percentage of weather by 6, and the percentage of temperature by 4, and dividing their sum by 10.

CAUTIONARY SIGNALS FOR OCTOBER, 1888.

Statement showing percentages of justifications of wind signals and cold-wave signals for the month of October, 1888:

Wind signals.—Total number of signals ordered, one hundred and seventy-three. Number of cautionary signals ordered, one hundred and sixty-nine; justified, wholly or in part, ninety. Number of storm signals ordered, four; justified, three. Number of signals ordered for easterly winds, eighty-four; justified, seventy-eight. Number of signals ordered for westerly winds, eighty-nine; justified, seventy-nine. Number of signals ordered late, ten. Number of storms without signals, twenty-three. Percentage of justifications, 62.3.

Cold-wave signals.—Total number of signals ordered, one hundred and thirty-two; justified, wholly or in part, forty. Number of severe cold-waves without signals, twelve. Percentage of justifications, 27.4.

LOCAL VERIFICATIONS.

The following extracts from the published reports of the state weather services for October, 1888, show the percentages of verifications of weather and temperature signals:

Nebraska.—The percentages of correct predictions for the state were: temperature, 89.7; weather, 82.1; mean, 85.9.

Ohio.—The percentages of verifications of weather signals (received from Washington and distributed to thirty-two stations) were: weather, 75; temperature, 80.

South Carolina.—The percentages of verifications for the state were: weather, 86.5; temperature, 84.5.

Tennessee.—The percentages of verifications of weather and temperature predictions for the month at the following stations were: Jonesborough, weather, 90.0; temperature, 96.3. Clarksville, weather, 85.2; temperature, 63.0. Pulaski, weather, 80.0; temperature, 80.0. Burkesville, weather, 92.0; temperature, 100.0.

STATE WEATHER SERVICES.

[*Temperature in degrees Fahrenheit; precipitation, including melted snow, in inches and hundredths.*]

The following extracts are republished from reports for October, 1888, of the directors of the various state weather services:

ALABAMA.

From the 1st to the 13th the sky was overcast with heavy clouds and the weather was generally threatening, with high temperature, and low pressure. The second period of low pressure, from the 19th to the 26th, produced heavy rains over the entire state, with correspondingly high temperature. The clear and fair days of the month generally occurred on those days when high pressure waves were crossing the state.

The average temperature was 5.5 below the normal. The average precipitation was 1.29 above the normal. The month was generally mild with but few cool days, and the frosts that occurred were light.

Summary.

Temperature.—Monthly mean, 61.6; highest monthly mean, 66.3, at Troy; lowest monthly mean, 54.6, at Valley Head; maximum, 87, at Eufaula, 5th; minimum, 30, at Valley Head, 13th; range for state, 57; greatest local monthly range, 49, at Valley Head; least local monthly range, 34, at Troy.

Precipitation.—Average for the state, 4.44; greatest, 8.53, at Union Springs; least, 2.15, at Tuscaloosa.

Wind.—Prevailing direction, north.—*P. H. Mell, Signal Corps, Auburn, director.*

ARKANSAS.

The temperature was generally below the average for the same month of last year. The rainfall was in excess of the October, 1887, amount. Some frosts were reported, the dates of their most frequent occurrence being the 13th, 20th, and 24th; they were not, however, general, and in some portions of the state there was no frost.

Summary.

Temperature.—Monthly mean, 59.1; highest monthly mean, 64, at Texarkana; lowest monthly mean, 56, at Alexander; maximum, 88, at Portia; minimum, 32, at Alexander, Devall's Bluff, and Portia; range for state, 56; greatest local monthly range, 56, at Portia; least local monthly range, 26, at Dallas.

Precipitation.—Average for the state, 2.02; greatest, 4.60, at Ozone.—*Prof. John C. Branner, Little Rock, director; W. U. Simons, Corporal, Signal Corps, assistant.*

ILLINOIS.

The temperature was considerably below the average of preceding Octobers, but was more equable than usual. The warmest days were the 1st and 31st, and the coolest day the 3d. There were occasional frosts, but none very severe, and, as a whole, the month was very favorable for agricultural operations and for vegetation generally.

Summary.

Temperature.—The mean temperature of the state was 50.7, which was 4 below the mean for the past ten years. The mean of the northern division was 47.8; the central division, 50.9, and the southern division, 53.3.

Precipitation.—The rainfall was not far from the average—in some districts above and in others below. There was a very heavy general rain on the 18th, on which date the greater part of the whole month's rain fell. The greatest deficiency, 2.37, occurred at Sycamore, and the greatest excess, 2.58, at Pana. Among the heaviest rainfalls reported on the 18th were: Philo, 3.60; Atwood, 3.12, and Lacon, 2.69. There were several daily rainfalls of over one inch; the largest being 2 at Pana on the 5th. Thunder-storms were not numerous or severe. Frosts were numerous but not severe.

Wind.—Prevailing direction, southwest.—*Col. Charles F. Mills, Springfield, director; James Cassidy, Sergeant, Signal Corps, assistant.*

INDIANA.

Although no excessively low temperatures or very abrupt changes occurred, the mean for the month was about five degrees below the normal, and the lowest noted since 1871, and probably earlier. Corresponding to the lowest and highest barometric areas, the highest means were noted on the 1st, and the lowest on the 21st; the maximum and minimum temperatures, at most stations, were also noted on those dates, respectively, except in the central portion of the state, where the lowest readings occurred on the 3d, with a sudden and excessive rise in pressure, when ice and killing hoar-frost were formed, and on the 21st in the southern and northern portions during the highest barometric pressure.

Rain fell quite frequently during the month, and the amount measured was quite abundant, and about 1.13 in excess of the normal amount for October. The heaviest measurements were recorded in the southern and central portions from the 18th to 22d, and in the northern portion on the 18th and 19th. The ample precipitation was very beneficial to the wheat crop and to grass. Spits of snow, the first of the season, were reported from Worthington and Angola. Hail fell only at a few isolated places during the thunder-storms of the 1st and 18th. Hoar-frost occurred frequently nearly everywhere throughout the state during the month.

Summary.

Temperature.—Monthly mean, 49.3; highest monthly mean, 56.2, at Mount Vernon; lowest monthly mean, 44.9, at Mauzy; maximum, 80, at La Fayette, 1st; minimum, 24, at Mauzy, 3d, 21st; range for state, 56; greatest local monthly range, 54, at La Fayette; least local monthly range, 39, at Blue Lick.

Precipitation.—Average for the state, 3.50; greatest, 5.97, at Richmond; least, 1.56, at Columbia City; greatest daily rainfall, 2.79, at Richmond, 18th.

Wind.—Prevailing direction, southeast and southwest.—*Prof. H. A. Huston, La Fayette, director; C. F. R. Wappenhans, Sergeant, Signal Corps, assistant.*

IOWA.

The month was cool and dry, northwesterly winds prevailing. The mean temperature was 1.3 below the normal, a small deviation from normal for a fall month. The first two decades were decidedly cold, being 4 below normal, while the last decade was warm, being 3 above normal. The coldest days were the 2d and 3d, and the three days from the 20th to the 22d averaged about 10 below normal. The last two days of the month were quite warm, especially the last day, which, being over 20 above normal and thus having the normal temperature of the beginning of September, preceded the noted storm of November 1st.

The mean cloudiness was nearly normal, but the middle decade was the most cloudy and had the most frequent precipitation, which was, however, either light or local. Rain fell in the west on three days, and in the east on five days during the month. The total amount of precipitation was less than one inch in the south, west, and northwest; it exceeded one inch in the southwest, centre, and the east sections. In the territory extending from Buchanan and Linn to Jackson counties, the total rainfall was greatest, exceeding two inches. The greatest precipitation fell on the 10th and 11th in central Iowa; on the 14th in the west, and on the 18th in the east, where from Iowa to Buchanan counties, and eastward, it exceeded one inch. The first snow of the season fell on the 19th in northeastern Iowa, and on the 21st, except in the extreme east and southeast, the fall being extremely light. A thunder-storm was quite extended over the state on the 17th and 18th, and over eastern Iowa on the 26th. Light hail was associated with these storms in a few places. No destructive winds were reported. Fog extended over the state on the 14th, and over eastern Iowa on the 27th. Halos were seen on the 9th in the northeast, and on the 20th in the southwest. The northern lights were seen in eastern Iowa on the 30th.—*Gustavus Hinrichs, Iowa City, director.*

KANSAS.

The deficiency in temperature occurring in August and extending through September has continued in the eastern and middle divisions and the southeastern portion of the western division, the greatest deficiency occurring in Shawnee and the counties to the north and northeast, and ranging from 3 to 6 below the October normal. An excess occurred in Russell and extended southwest through Rush, Ness, Hodgeman, Garfield, and Gray into Haskell.

There was an excess of precipitation in Marshall, which extended thence southeast through Pottawatomie, Jackson, Jefferson, northern part of Douglas, and southern part of Leavenworth into Johnson. An excess again occurred in Crawford and Cherokee and west through Labette, Montgomery, and Chatauqua into the southern parts of Cowley and Sumner. Throughout the rest of the state there was a deficiency, which was greatest from Reno to Osborne, extending southwest to Ness, Hodgeman, and Ford, thence, with constantly narrowing limits, west to Greeley, while in Wallace and the extreme southwestern counties it was nearly normal.

Summary.

Temperature.—Monthly mean, 55.6; highest monthly mean, 59.6, at Santa Fé; lowest monthly mean, 47.5, at Montero; maximum, 91, at Lebo, 4th; minimum, 20, at Cawker City (six miles northwest of Concordia), 20th; range for state, 71; greatest local monthly range, 65, at Lebo; least local monthly range, 45, at Montero; greatest daily range, 50, at Lebo, 29th; least daily range, 2, at Lebo and Seneca, 14th.

Precipitation.—Average for the state, 1.53; greatest, 3.74, at Lawrence; least, 0.12, at Kanopolis.

Wind.—Prevailing direction, south.—*Prof. J. T. Lovewell, Topeka, director; T. B. Jennings, Sergeant, Signal Corps, assistant.*

KENTUCKY.

Summary.

Temperature.—Monthly mean (eight stations), 52.3; highest monthly mean, 54.5, at Owenton; lowest monthly mean, 50.4, at Lexington; maximum, 83, at Whitesburgh, 27th; minimum, 28.7, at Frankfort, 21st; range for state, 54.3; greatest local monthly range, 50.2, at Frankfort; least local monthly range, 39, at Millersburgh.

Precipitation.—Average (nine stations), 3.45; greatest, 7.58, at Whitesburgh; least, 1.09, at Madisonville.—*Under direction of the State Polytechnic Society, Louisville; Frank Burke, Sergeant, Signal Corps, assistant, in charge.*

LOUISIANA.

The temperature was less than a degree below the normal for the same month of the past eighteen years. The deficiency occurred in the first half of the month, the latter portion being warmer than usual.

The general rain of the 22d broke a drought of a month's duration, and was very badly needed for the sugar and vegetable interests. There was about the average amount of sunshine received, being most during the early part of the month at the time of the cool weather, and the effects on the agricultural interests were very beneficial.

Light frosts occurred in the northern part of the state on the 28th and 31st, and in Avoyelles and Saint John Baptist parishes during the second week of the month, but were so light as to be scarcely noticeable.

Summary.

Temperature.—Monthly mean, 66.6; highest monthly mean, 72.5, at Abbeville and Shell Beach; lowest monthly mean, 61.1, at Vidalia; maximum, 92, at Liberty Hill, 2d; minimum, 33, at North Louisiana Experiment Station, 28th and 29th; range for state, 59; greatest local monthly range, 54, at Liberty Hill; least local monthly range, 28, at Shell Beach; greatest daily range, 43, at

Liberty Hill, 4th, 29th, 30th; least daily range, 1.5, at Crowley, 23d; mean daily range for the state, 20.3.

Precipitation.—Average for the state, 3.55; greatest, 7.36, at New Orleans; least, 0.54, at Coushatta; greatest daily rainfall, 4.13, at New Orleans, from night of 22d to night of 23d.

Wind.—Prevailing direction, north.—*R. E. Kerkam, Sergeant, Signal Corps, New Orleans, in charge.*

MICHIGAN.

The mean temperature for the month, 44.8, was 4.8 below the normal for thirteen years. The temperature was below the normal in all sections. The mean daily temperature was above the normal on five days, and below on twenty-six. The highest mean daily temperature, 58, occurred on the 31st, when the temperature was 14 above the normal, and the lowest, 37, on the 20th, when the temperature was 10 below the normal. The highest mean daily temperature for the past thirteen years, 72, occurred on the 1st, in 1878, and on the 6th, 7th, and 10th, in 1879, and the lowest, 30, on the 29th, in 1887. The highest monthly mean temperature, 57.6, occurred in 1879, and the lowest, 44.1, in 1887. The maximum temperature, 76, occurred on the 31st, at Petersburgh, and the minimum, 21, on the 9th, at Birmingham.

The average precipitation, 2.29, was 1.01 below the normal of thirteen years. The precipitation was below the normal in all sections; the greatest deficiencies occurred in the northern, and the least in the southern, section. General rains fell on the 1st, 5th, 6th, 7th, 12th, 13th, 15th, 16th, 18th, 19th, 22d, 26th, and 27th, and local rains on the 2d, 3d, 4th, 8th, 14th, 17th, 20th, 21st, 23d, 24th, 28th, and 31st. The largest precipitation for October during the past twelve years was 6.40, in 1881, and the smallest, 2.11, in 1879. Thunder-storms were reported on seven days. Light snow was generally reported on the 19th and 20th. The largest snowfall, eight inches, was reported at Calumet. There was no snow on the ground at the close of the month.

Summary.

Temperature.—Monthly mean, 44.8; highest monthly mean, 49.3, at Albion; lowest monthly mean, 37.7, at Atlantic; maximum, 76, at Petersburgh, 31st; minimum, 21, at Birmingham, 9th; range for state, 55; greatest local monthly range, 51.5, at Adrian; least local monthly range, 28, at Bronson; greatest daily range, 40, at Hart, 10th; least daily range, 1.6, at Sault de St. Marie, 1st.

Precipitation.—Average, 2.29; greatest, 3.84, at Gulliver Lake; least, 0.73, at Grand Rapids.

Wind.—Prevailing direction, southwest.—*N. B. Conger, Sergeant, Signal Corps, Lansing, director.*

MINNESOTA.

October, like the preceding month, was characterized by a deficiency in rainfall and a slight deficiency in temperature. The month was about three degrees cooler than is usual for October, and there was little more than one-half the usual rainfall. The first light snow of the season occurred on the 19th; this was eight days later than the date of the first snow of last year. In the southeastern counties snow fell in sufficient quantities on the 27th to fully cover the ground.

Summary.

Temperature.—Monthly mean, 42.6; highest monthly mean, 45.8, at Mankato; lowest monthly mean, 38.3, at Pokegama Falls Dam; maximum, 76, at Saint Vincent and Medford, 7th; minimum, 18, at Pokegama Falls Dam, 5th; range for state, 58; greatest local monthly range, 57, at Saint Vincent; least local monthly range, 41, at Red Wing; greatest daily range, 42.7, at Saint Vincent, 6th; least daily range, 3.2, at Saint Vincent, 11th, 19th.

Precipitation.—The average for the state, 1.38; greatest, 2.37, at Leech Lake Dam; least, 0.42, at Grand Meadow.

Wind.—Prevailing direction, northwest.—*Prof. W. W. Payne, Northfield, director; John Healy, Private, Signal Corps, Saint Paul, assistant.*

MISSISSIPPI.

The weather during the month was unusually mild; the minimum temperature that occurred, 38, being 10 higher than the minimum temperatures reported during October in 1886 and 1887. The average rainfall was 0.38 in excess of the normal. The rainfall was well distributed, but occurred so frequently as to interfere with and retard cotton picking in many sections.

Summary.

Temperature.—Monthly mean, 64; highest monthly mean, 68, at Biloxi and Pearlington; lowest monthly mean, 59, at Memphis, Tenn., and Holly Springs; maximum, 88, at Brookhaven, 17th, and Hazlehurst and Port Gibson, 5th; minimum, 38, occurred at five stations; range for state, 50; greatest local monthly range, 48, at Meridian; least local monthly range, 29, at Biloxi; greatest daily range, 41, Macon, 21st; least daily range, 1, at Pearlington, 23d.

Precipitation.—Average for the state, 2.77; greatest, 6.12, at Lake; least, 0.23, at Hazlehurst. Average number of days on which rain fell, 6.—*Prof. R. B. Fulton, University, director; M. J. Wright, jr., Sergeant, Signal Corps, assistant.*

MISSOURI.

The mean temperature for October was 52.9. The highest temperature reported in the state was 89, at Lamonte, and the lowest, 24, at Ironton. The average maximum temperature was 83.8, and the average minimum temperature, 31.1, making an average range of 52.7. The highest temperatures occurred on the 7th, 17th, and 18th, and the lowest on the 3d, 29th, and 21st. Frost was reported at nearly all stations on the 3d, 14th, 20th, and 28th. Many stations reported light frost on the 17th, 21st, and 23d.

Average precipitation, 2.62, which was less than the October normal. The greatest amount reported was 5.07, at Springfield, and the least, 0.57, at Frankford. In the state, as a whole, rain fell on twenty-three days. The greatest number of days of rain at any one place was fourteen at Cairo, Ill.

Thunder and lightning occurred on the 1st, 4th, 5th, 10th, 11th, 14th, 15th, 17th, 18th, 19th, and 26th. The thunder-storms on the 4th, 14th, and 18th extended over almost the entire state.—*Prof. Francis E. Nipher, Saint Louis, director; G. A. Weber, Sergeant, Signal Corps, assistant.*

NEBRASKA.

The month has been cool and dry and following, as it has, an extended period of drought it leaves the ground in an unfavorable condition for winter, as regards the safety of small fruit.

Summary.

Temperature.—The mean for October in southeastern Nebraska is 49.6. This is 3 below the normal, the means for the past eleven years ranging from 48.6 to 60.7. The maximum for the month, 86, has been about as usual, the minimum, 12; is lower than for any past October, except in 1887.

Precipitation.—The precipitation for the month has been small; less than an inch for the northern and western parts of the state; from one to two inches generally south of the Platte and over two inches in the extreme southeastern part of the state. The October precipitation has not been so small since 1878. A slight fall of snow occurred very generally throughout the state on the 21st. The number of clear and cloudy days has been about normal; the number of rainy days, like the precipitation itself, deficient.—*Prof. Goodwin D. Swezey, Crete, director; G. A. Loveland, Corporal, Signal Corps, assistant.*

NEW ENGLAND METEOROLOGICAL SOCIETY.

Summary.

Temperature.—Monthly mean, 44.2 (ninety-nine stations); highest monthly mean, 49.8, at Newport, R. I.; lowest monthly mean, 36.9, at Mayfield; maximum, 74, at Colchester, on the 18th; minimum, 8, Berlin Falls, on the 23d; range for New England, 66; greatest local monthly range, 63, at Berlin Falls; least local monthly range, 21, at Belfast; greatest daily range, 57, at Berlin Falls, on the 23d; least daily range, 0, at Concord, N. H., on the 9th, Rowe on the 19th, Woonsocket on the 1st, 12th, 27th.

Precipitation.—Average for New England, 5.39 (125 stations); greatest, 9.92, at Walpole; least, 2.37, at Block Island.

Wind.—Prevailing direction, northwest (17 stations).—*Prof. William H. Niles, Boston, Mass., president; Prof. Winslow Upton, Providence, R. I., secretary; Park Morrill, Sergeant, Signal Corps, assistant.*

NEW JERSEY.

The mean temperature for October, 1888, 49.2, is 5.2 below the average determined from the past records of fifty stations. The warmest days of the month were the 1st, 2d, 5th, and 6th, and the coldest the 4th, 10th, 11th, 22d, 30th, and 31st. The average rainfall for the state, 4.73, is 1.54 above the average determined from past records of forty-eight stations. The average number of days upon which rain fell, 11.6.

Summary.

Temperature.—Monthly mean, 49.2; highest monthly mean, 54.3, at Ocean City; lowest monthly mean, 44.0, at Hanover; maximum, 76.0 at Clayton, on the 1st; minimum, 24.0, at Hanover, on the 10th, 11th, 31st; range for state, 51.0; greatest local monthly range, 44.0, at Clayton; least local monthly range, 30.0, at Billingsport; greatest daily range, 34.4, at Egg Harbor City, on the 21st; least daily range, 0.5, on the 24th, at Egg Harbor City.

Precipitation.—Average for the state, 4.73; greatest, 7.00, at Ocean City; least, 2.97, at Freehold.

Wind.—Prevailing direction, northwest.—*Prof. George H. Cook, New Brunswick, director; E. W. McGann, Sergeant, Signal Corps, assistant.*

NEW YORK.

Summary.

Temperature.—The highest temperature for the month was 75, at Humphrey; lowest, 22, at Utica, 11th. The mean monthly temperature for the entire state was 43, the 5th being the hottest day and the 21st the coldest, while the general temperature of the state has been below the normal.

Precipitation.—The amount of rainfall has been larger than usual, the average for the state being 4.04; all stations, but Boyd's Corners, Erie (Pa.), and Palermo, reporting excessive rain. The greatest rainfall was 2.11, at White Plains, 6th. Daily rains have been reported in the state, excepting on the 25th and 26th. The average number of days on which 0.01 or more fell, was sixteen. Hail fell on the 2d, 3d, 8th, and 16th. Snow fell on the 3d, 20th, 29th, and 30th. Frosts were of frequent occurrence.

Wind.—Prevailing direction, northwest.—*Prof. E. A. Fuertes, Ithaca, director; I. W. Brewer, Private, Signal Corps, assistant.*

NEVADA.

Summary.

Temperature.—The temperature generally was high for the season, especially up to the 20th of the month. The highest reported is 100.4, at El Dorado Canyon, 12th, and the next highest, 85.8, at Carson City, 11th. The lowest reported is 17.5, at Tuscarora, 25th, and the next lowest, 18.8, at Carson City, 22d. The warmest part of the month was from the 11th to the 15th, and the coldest from the 20th to the 26th. The means ranged from 50 to 57, excepting at Rioville and El Dorado Canyon, in Lincoln county. The mean at Winnemucca and Carson City was 51.2. Carson City reports the highest mean temperature in eight years. On the 14th the mercury fell to 7 at Elko. A slight cold wave visited Virginia City and lasted from the 18th to the 24th. The temperature was such at the end of the month that the trees shed their leaves and vegetation assumed a wintry appearance.

Precipitation.—No snow was reported except a light fall at Virginia City on the 1st, and very little rain, and that was confined to Lander and the adjoining counties, and occurred on the 1st and 2d, except as follows: Heavy rain at Tuscarora during severe thunder-storm on the 1st. 4th, during a thunder-storm a cloud burst over Elko and tons of water fell upon the town, causing general consternation. "The Central Nevadan" of October 4th says: "Heavy rains in Reese River Valley have caused Reese River to rise; the water is now within three miles of town, and the probabilities are that before another day the Reese will empty into the Humboldt. The Reese usually sinks in the sand when still fifty miles from the Humboldt. Only twice in thirty years has it been known to reach the latter river."

Wind.—Prevailing direction, northeast.—*Prof. Charles W. Friend, Carson City, director; E. H. Thompson, Private, Signal Corps, assistant.*

NORTH CAROLINA.

Summary.

Temperature.—Monthly mean, 57; highest monthly mean, 62.9, at Southport; lowest monthly mean, 52.1, at Knoxville, Tenn.; maximum, 83, at Cheraw, S. C.; minimum, 32.5, at Mount Pleasant; range for state, 50.5.

Precipitation.—Mean monthly rainfall, 4.55; greatest monthly rainfall, 7.09, at Mount Pleasant; least, 1.81, at Chapel Hill.

Wind.—Prevailing directions, southwest and northwest.—*Dr. Herbert B. Battle, Raleigh, director; H. McP. Baldwin, Sergeant, Signal Corps, assistant.*

OHIO.

Summary.

Temperature.—This was the coldest October since the opening of the bureau in 1882. The mean temperature of the northern section was 46.8; of the middle section, 47.4; and of the southern section, 49.4. These means are 3.6, 3.8, and 4.0 below the six-year averages for the sections. The mean for the state, 47.9, was 3.8 below the average. The average daily range of temperature, 17.1, is the smallest for October since 1883. The maximum temperature, 80, occurred at North Lewisburg on the 1st, and the minimum, 22.0, at New Comerstown on the 18th and 20th. Killing frost was general in all sections on the 3d, 9th, 10th, 18th, 21st, and 30th.

Precipitation.—General rains occurred in all sections on the 1st, 5th, 6th, 12th, 13th, 15th, 16th, 19th, 22d, 23d, and 26th; in the northern section on the 2d, 7th, 8th, 14th, 20th, 24th, 27th, and 28th; in the middle section on the 7th, 8th, 11th, 17th, and 27th; and in the southern section on the 2d and 14th. Snow was reported from the northern section on the 2d, 12th, and 20th, and from the middle section the 20th. Mr. Moses Craig, Ohio State University, reports a violent gale from the west at five p. m. of the 1st, accompanied by heavy rain and some hail. He also reports rain from a cloudless sky on the evening of the 7th. The mean rainfall for the northern section was 2.51; for the middle section, 2.68; for the southern section, 2.84; and for the state, 2.68. These means are 0.43, 1.66, 1.81, and 1.30 above the six-year average. More rain fell during the month than in any October since 1883. The greatest monthly rainfall was 5.99, at Sidney, and the least, 1.64, at Toledo.—*Prof. B. F. Thomas, Columbus, director; Lieut. Charles E. Kilbourne, secretary; C. M. Strong, Private, Signal Corps, assistant.*

PENNSYLVANIA.

Summary.

Temperature.—The mean temperature for the month of October was 46.1, which is about 6 below the average, and largely increases the temperature deficiency since January 1st. The highest temperatures during the month were below those generally attained in October, while the lowest were about the same. The former occurred on the 1st, and most of the latter on the 10th, although several stations report other dates. The highest recorded were: Columbus, 74; Pittsburgh, 73.8; Beaver, 73; Charlesville and New Castle, 73. The lowest were: Clarion, 19.2; Greenville, 20.5; Coudersport, 21; Dyberry, 22; and Honesdale, 23. The means of the daily maximum and minimum from fifty stations are, respectively, 54.7 and 38.0. These give a mean of 46.3, which differs only 0.2 from the mean (46.1) derived from the tri-daily observations.

Precipitation.—The average rainfall over the state for the month was 4.02, which is an excess. Very few heavy rainfalls occurred, but the days on which rain fell were so numerous that the month has been unusually wet and disagreeable. The percentage of humidity ranged high, and there was more than the usual number of cloudy days. A few snowfalls were reported, but they were light. The greatest was one inch, at Somerset.

Wind.—Prevailing direction, northwest.—*Under direction of the Franklin Institute, Philadelphia; T. F. Townsend, Sergeant, Signal Corps, assistant, in charge.*

SOUTH CAROLINA.

Summary.

Temperature.—Mean of the state, 59.3; highest monthly mean, 66.2, at Timmonsville; lowest monthly mean, 53, at Cedar Springs; maximum, 88, at Branchville, 6th; minimum, 31, at Cedar Springs, 21st. In a majority of instances the maximum occurred the 6th, and the minimum the 1st and 20th.

Precipitation.—The mean depth of rainfall was 4.18, while the record for October, 1887, shows a mean depth of 5.96. The greatest amount of precipitation occurred at Allendale, where a fall of 7.83 was recorded for the month, and the least at Chesterfield, where 2.34 fell.

Wind.—Prevailing direction, southwest.—*Hon. A. P. Butler, Columbia, director; H. C. Seymour, Private, Signal Corps, assistant.*

TENNESSEE.

There were no special features during the month except the low temperature mean and the large percentage of cloudiness and proportion of rainfall.

Summary.

Temperature.—The mean temperature was 54.6, nearly four degrees less than the October mean of the past six years, and the lowest during that period, except in 1885, when it was about the same. The highest local mean was 57.5, at Covington, and the lowest, 51.4, at Rogersville and Springdale. The maximum was 84, at McKenzie, 1st, and the lowest October maximum during the past six years. The minimum was 29, at Lawrenceburgh, 14th, and was the highest October minimum recorded in the period above named. The maximum temperatures were generally recorded about the 1st and 18th in the western division, and about the 18th and 19th in the other divisions, and the minimum about the 14th and 21st in the western division, and about the 14th, 21st, and 29th in the middle division, and the 21st and 29th in the eastern division. The daily ranges of temperature were generally less than normal. There were three cold-wave warnings sent out during the month, viz., 2d, 5th, and 19th, two of which, the 2d and 19th, were verified, and proved of inestimable value throughout the state to farmers, stock-breeders, florists, and gardeners. The warning of the 5th was not fully verified. On the 28th and 29th a cold wave occurred for which no warning was given. At Nashville the temperature fell from 61 on the 28th to 38 on the 29th.

Precipitation.—The mean depth of rainfall was 4.06, most of which fell during the latter half of the month. From the 19th to the 28th, inclusive, there were almost constant rains, some of them very heavy, particularly those of the 19th, throughout the state, and the 25th and 26th, mostly in the eastern division. Of the total amount which fell during the month the eastern division received by far the greater proportion, an average of nearly 6.00, while the middle division received an average of 3.25 and the eastern division about 3.00. The greatest rainfall reported was 7.22, at Andersonville, and the least, 1.40, at McKenzie. The greatest local daily rainfall was 3.00, at Fostoria, 26th; the next, 2.06, at Waynesborough, 19th, and 2.00, at Andersonville, 26th. From the 1st to the 15th the rains were generally light. The 19th was the day of the greatest rainfall. There were nine days on which no measurable rainfall was reported. Frosts were reported on about nineteen days, those of the 4th, 14th, 21st, and 29th being killing frosts, the others light.

Wind.—prevailing direction, northwest.—*J. D. Plunket, M. D., Nashville, director; H. C. Bate, Signal Corps, assistant.*

TEXAS.

Summary.

Temperature.—Average for the state, 67.4; mean maximum temperature, 79.4; mean minimum temperature, 57.8; highest temperature reported, 93.8, at Rio Grande City, 21; lowest, 33.8, at Mesquite, 24th; absolute range, 60. The greatest monthly range of temperature was 56.2, and the least, 31.2. The average range of temperature along the coast was 34.2; in the interior, 48.2; and for the state, 46.8. At thirteen stations the minimum temperature was below 40 one day during the month. At Fort Elliott there were nine days on which the temperature reached 40 or below, and at Weatherford six days.

Precipitation.—The average rainfall for the state was 2.03. This amount is considerably below the average for October. Probably not in any October in many years was the deficiency in rainfall to be less regretted, as the cotton crop was late, and required good weather to mature it. The greatest amount of precipitation in any twenty-four hours at any station was 3.04 at Galveston, on the 22d. The greatest monthly precipitation, 5.67, also occurred at Galveston. Except at Weatherford, where no rainfall was recorded, the least monthly precipitation, 0.50, occurred at Dallas. Amounts exceeding 3.00 fell at Austin, 4.45; Galveston, 5.67; Houston, 4.92; Sour Lake, 4.50; and less than 1.00 fell at Weatherford, 0.00; Dallas, 0.50; Fort Elliott, 0.85; Mesquite, 0.63; San Antonio, 0.85; Tyler, 0.75; Waco, 0.60.—*S. O. Young, M. D., Galveston, director; Allen Buell, Sergeant, Signal Corps, assistant.*

Meteorological record of voluntary observers and Army post surgeons, October, 1888.

The maximum and minimum temperatures at stations marked thus (*) are from readings of other than standard instruments.

Stations.	Temperature. (Fahrenheit.) Max.	Min.	Mean	Precip'n.
Alabama.	°	°	°	*Ins.*
Auburn	81	43	62.2	4.39
Bermuda	82	41	65.5	7.00
Carrollton	81	42	65.6	5.29
Citronelle	91	46	68.2	3.45
Edwardsville	78	40	63.2	3.50
Eufaula	87	43	62.4	4.56
Florence	77	29	58.3	3.61
Fort Deposit	84	43	62.4	2.46
Gadsden	80	36	56.3	4.20
Greensborough	83	46	61.9	4.40
Livingston	85	40	62.0	3.05
Marion	82	42	62.7	6.14
Mt. Vernon B'ks	89	44	66.5	5.10
New Market	77	38	59.5	3.80
Pine Apple	85	42	60.7	.....
Selma	84	41	62.5	4.41
Talladega	77	37	63.5	4.35
Troy	85	51	66.3	4.75
Tuscaloosa	78	38	60.1	2.15
Tuscumbia	81	40	58.4	3.92
Uniontown	84	45	64.9	4.54
Union Springs	84	42	63.0	8.53
Vernon	81	46	65.7	3.06
Valley Head	77	30	54.6	4.38
Arizona.				
Antelope Valley	.....	.....	.....	2.08
Fort Huachuca	89	38	65.9	2.12
Fort McDowell	104	40	70.2	2.92
Fort Mojave	102	44	72.5	0.86
Globe	89	.....	.....	2.39
Holbrook*	83	28	56.6	0.50
Prescott Junction	87	25	55.0	.....
Prescott	84	29	55.9	1.75
Teviston	.....	.....	.....	0.16
Tombstone	.....	.....	.....	0.49
Tucson	98	.....	.....	0.78
Williams	75	27	48.3	.....
Winslowe	88	32	55.9	0.84
Winslowb	82	26	55.4	.....
Arkansas.				
Alexander	80	32	56.0	2.30
Conway	84	38	57.5	2.76
Dallas	72	46	62.6	1.99
Dayton	86	38	60.6	3.50
Devall's Bluff	82	32	58.6	0.00
Forrest City	83	42	62.4	0.52
Heber	84	33	56.7	1.80
Helena	81	39	59.4	0.00
Hot Springs	.....	32	.....	3.04
Lead Hill	90	31	56.9	3.10
Lonoke	79	39	61.5	3.19
Osceola	81	38	57.8	2.47
Ozone	78	39	56.7	4.60
Portia	88	32	57.1	3.02
Prescott	80	37	61.3	0.00
Russellville	80	35	57.8	2.20
Stuttgart	76	35	57.8	3.42
Texarkana	87	36	64.0	0.72
Washington	83	35	60.9	1.79
British Columbia.				
New Westminster	73	34	51.6	8.94
California.				
Alcatraz Island	81	50	59.3	0.07
Angel Island	91	.....	.....	T.
Banning	102	50	71.4	0.26
Barstow	95	43	67.0	0.38
Benicia Barracks	90	48	64.9	.....
Georgetown	84	44	62.2	.....
Lewis Creek*	93	49	71.0	0.00
Needles	100	46	72.4	0.83
Oakland	82	46	60.2	0.06
Oroville	89	45	68.0	0.00
Presidio of San F	88	43	59.8	0.10
Sacramento	82	37	57.6	0.00
Salinas	82	40	55.7	0.00
Susanville	74	36	50.2	0.01
Santa Barbara	95	50	63.5	0.07
Willow	93	40	63.1	0.00
Colorado.				
Delta	86	24	47.4	1.79
Fort Collins	72	24	48.5	0.88
Fort Lewis	72	22	46.6	1.27
Fort Lyons	85	19	52.9	0.63
Georgetown	63	24	42.7	0.98
Rocky Ford	83	31	56.4	0.53
Connecticut.				
Birmingham	.....	.....	.....	3.44
Canton	65	26	†	5.95
Clark's Falls	.....	.....	.....	5.21
Colchester	74	28	46.8	.....
Hartford *a*	63	28	42.2	6.10
Hartford *b*	.....	.....	.....	5.38
Lake Kenomoc	.....	.....	.....	4.40
Mansfield	65	26	43.8	6.35
Middletown	66	28	45.5	6.11
New Britain	.....	.....	.....	5.72
New Hartford*	62	27	40.3	5.67
Pomfret	.....	.....	.....	4.84
Shelton	65	27	44.6	7.64
Southington	67	25	45.3	4.70

Stations.	Temperature. (Fahrenheit.) Max.	Min.	Mean	Precip'n.
Connecticut—Cont'd.	°	°	°	*Ins.*
Thompson	67	28	43.8	.....
Uncasville	.....	.....	.....	5.45
Voluntown	66	33	46.1	4.40
Vernon Centre	.....	.....	.....	4.43
Waterbury	66	24	44.1	4.72
Wallingford	.....	.....	.....	6.52
W. Simsbury	.....	.....	.....	5.29
Dakota.				
Brookings	82	21	42.9	0.62
Davenport	79	17	40.0	1.04
Fort A. Lincoln	80	16	42.8	0.25
Fort Meade	75	15	44.8	0.14
Fort Pembina	78	20	41.0	1.48
Fort Randall	90	20	47.0	0.66
Fort Sisseton	77	24	43.2	0.60
Fort Sully	79	19	48.8	0.21
Fort Totten	81	21	43.3	0.76
Fort Yates	80	18	47.9	0.11
Gallatin*	.....	.....	43.8	.....
Garden City	77	19	41.2	0.37
Grand View	84	27	54.0?	0.42
Kimball*	76	20	37.0	0.60
New England City	75	13	38.5	0.48
Spring Lake*	68	12	†	0.75
Webster	81	22	43.0	1.35
Woonsocket	80	16	42.0	0.47
District of Columbia.				
Distribut'g Res'v'r*	69	38	53.9‡	4.00
Kendall Green*	70	34	52.2‡	3.44
Receiving Res'v'r*	71	37	53.0‡	3.82
Rock Creek Bridge*	76	38	56.3‡	.....
Delaware.				
Kirkwood	60	34	50.0	.....
Newark	68	29	48.7	4.01
Florida.				
Altamonte Springs	91	52	72.7	2.26
Alva*	96	55	74.8	5.46
Archer	94	42	70.6	5.22
Duke	91	54	77.0	2.49
Fort Meade*	91	52	71.0	2.06
Homeland*	90	53	74.8	3.20
Manatee	92	55	75.2	2.32
Merritt's Island	87	63	75.5	3.31
Tallahassee	86	48	66.8	8.80
Georgia.				
Andersonville	100	39	62.7	5.57
Duck	74	29	63.5	5.16
Forsyth*	88	47	64.4	4.66
Hephzibah	72	50	62.1	.....
Marietta	79	35	57.0	3.80
Milledgeville	79	43	61.5	6.16
Quitman	85	45	67.4	5.20
Idaho.				
Boisé Barracks	80	26	55.0	0.72
Fort Sherman	78	22	48.7	1.55
Lewiston	91	32	†	1.53
Illinois.				
Aledo	74	27	46.6	1.68
Aurora*	78	24	47.4	3.10
Atwood	75	28	†	4.84
Beason	76	26	48.0	2.51
Belvidere	76	31	50.5	2.40
Benton	80	26	52.5	1.40
Brush Hill	81	29	51.8	2.30
Cedarville	75	29	46.5	1.87
Centralia	82	32	53.0	3.10
Charleston*	81	37	49.9	2.37
Collinsville	84	33	53.2	2.85
Dwight	79	21	49.6	3.26
Fairfield	87	31	57.1	1.08
Flora	78	27	51.0	2.36
Gibson City	74	28	48.2	4.37
Greenville	85	30	51.5	2.62
Griggsville	75	32	53.5	1.88
Golconda	82	36	55.6	2.78
Hennepin	79	24	47.3	2.71
Irishtown	85	35	52.6	2.47
Jacksonville	75	34	51.9	2.15
Joliet	76	30	48.3	3.30
Jordan's Grove	87	32	53.8	3.55
Kampville	81	26	51.2	1.02
Lacon	76	26	48.5	3.55
Lake Forest	72	27	46.9	2.57
Martinsville	68	28	53.2	1.13
Mascoutah	80	30	55.9	3.30
Mattoon	74	29	50.0	2.44
Monmouth	82	30	53.4	2.28
Mount Morris	75	23	46.2	.....
New Athens	81	28	54.5	2.40
Old DuQuoin	86	32	55.0	2.60
Olney	80	32	52.0	2.82
Oneida	76	30	47.8	3.45
Oquawka	82	38	50.9	1.05
Onwego	72	28	46.3	2.73
Ottawa	76	29	46.2	2.71
Palestine	81	26	51.7	2.55
Pana	82	32	54.2	5.83
Paris	78	32	49.0	2.66
Pekin*	78	26	51.8	2.40
Peoria	79	30	51.3	2.39

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.) Max.	Min.	Mean	Precip'n.
Illinois—Cont'd.	°	°	°	*Ins.*
Philo	78	27	49.0	4.50
Pontiac	74	26	49.6	2.35
Richview	.....	31	53.8	2.99
Riley	73	27	45.4	1.70
Rockford	75	26	49.0	1.80
Sandwich*	76	34	51.0	.....
South Evanston	74	28	46.6	2.10
Sumner	80	28	51.4	2.20
Sycamore	72	25	45.3	2.25
Vandalia	77	29	51.4	2.75
Watseka	75	25	47.6	2.36
White Hall	78	34	53.3	1.83
Willow Hill	79	32	52.0	1.60
Windsor	80	28	51.5	2.60
Winchester	84	25	54.9	2.53
Winnebago	78	30	48.0	1.75
Indiana.				
Angola	70	26	46.7	2.20
Blue Lick	74	35	51.2	3.61
Butlerville*	78	32	51.6	3.88
Columbia City	74	29	47.8	1.56
Columbus	76	30	48.7	3.71
Connersville	77	32	48.7	4.76
Delphi	77	30	48.8	3.03
De Gonia Springs	41	31	52.8	3.27
Farmland	72	30	49.4	4.16
Franklin	77	33	49.4	3.84
Huntingburgh	77	31	52.8	4.65
Jeffersonville	77	31	51.7	2.71
Lafayette	80	26	48.5	3.49
Mauzy	74	24	44.9	4.81
Mount Vernon	79	31	44.1	3.08
Princeton	78	32	52.4	2.90
Richmond	75	28	46.8	5.97
Rockville	78	28	52.0	2.60
Salem	76	32	47.6	3.75
Sunman	76	28	48.0	4.47
Seymour	74	34	52.2	3.59
Spiceland	77	27	48.7	3.91
Vevay	77	32	51.7	4.13
Worthington	75	28	50.3	3.10
Indian Territory.				
Fort Gibson	87	29	61.5	0.64
Fort Reno	86	32	65.6	1.52
Fort Supply	92	29	57.4	0.90
Iowa.				
Amana	72	22	47.3	1.59
Cedar Rapids	72	25	47.8	2.35
Clarinda*	78	28	49.3	1.40
Clinton	74	25	46.4	1.97
Cresco	76	26	44.1	0.85
Cromwell	.....	.....	.....	1.43
Denmark	74	38	55.4	2.52
Des Moines	79	25	49.6	.....
Dysart	71	22	47.9	1.90
Elkader	76	30	46.6	1.85
Fayette	75	22	43.4	1.09
Fort Madison	75	30	49.9	0.83
Glenwood *a*	76	22	50.5	.....
Glenwood *b*	84	26	52.5	1.35
Grinnell	71	31	48.0	1.73
Hampton	74	25	47.1	1.35
Independence*	68	32	46.2	2.07
Iowa City*	68	31	46.5	1.50
Logan	.....	.....	.....	0.73
Maquoketa*	74	.....	.....	1.90
Manson*	74	30	49.0	1.98
Monticello*	73	23	46.2	2.02
Mount Pleasant*	73	34	49.7	1.14
Muscatine	76	27	48.5	1.50
Osage	.....	.....	.....	1.30
Osceola	65	25	42.6	0.85
Oskaloosa *a**	76	29	52.0	1.20
Oskaloosa *b*	.....	.....	.....	2.00
Smithland	.....	.....	.....	0.45
Vinton	.....	.....	45.4	2.32
Washington	.....	.....	.....	1.10
Kansas.				
Allison	84	22	†	1.08
Bendena*	89	34	57.8	2.24
Brookville	96	26	56.0	1.40
Buffalo Park	86	36	†	1.33
Bunker Hill	88	28	52.3	0.65
Carneiro	88	.....	.....	0.65
Cawker City	79	20	51.0	1.00
Colby	78	21	48.2	1.05
Collyer	84	30	50.7	1.30
Cunningham	87	27	54.3	1.08
Dorrance	84	30	59.4	0.55
Elco	86	29	56.0	2.82
Ellis	84	22	54.7	.....
Elk Falls	88	32	59.9	2.39
Englewood	.....	.....	57.2	0.58
Fort Hays	85	20	53.7	0.70
Fort Leavenworth	85	30	54.6	2.56
Fort Riley	81	27	53.2	0.99
Gibson	84	28	52.1	1.00
Globe	83	30	53.1	3.75
Gorham	83	33	†	0.50
Gove	80	34	49.7	1.35
Grainfield	82	30	†	2.00
Grinnell	80	34	†	.....
Grenola	88	28	55.3	2.10
Havensville	.....	.....	.....	1.00
Hays City	.....	.....	54.2	0.75

Stations.	Temperature. (Fahrenheit.) Max.	Min.	Mean	Precip'n.
Kansas—Cont'd.	°	°	°	*Ins.*
Independence	87	29	56.5	3.56
Kanopolis	89	30	.....	0.12
La Harpe*	88	33	55.1	1.78
Lawrence	85	32	53.0	3.74
Lebo	91	26	52.9	2.07
Leoti	.....	24	.....	0.85
Manhattan	28	25	54.0	2.87
McAllaster	78	32	50.7	2.00
Monument	80	28	55.2	1.80
Montero	81	36	47.5	.....
Morse*	78	28	53.0	4.25
Oakley	88	.....	50.6	.....
Quinter	86	34	55.5	1.33
Rome	86	32	56.9	3.14
Russell	78	32	†	0.65
Santa Fé	87	29	59.6	2.01
Salina*	74	41	60.0	1.20
Sedan	87	30	55.2	3.12
Seneca	86	28	52.3	2.85
Stockton	.....	.....	.....	1.06
Tribune	84	26	53.0	0.84
Victoria	.....	.....	.....	0.61
Wakefield*	82	29	54.9	2.12
Waterville	85	30	57.7	3.24
Winona	86	33	53.8	.....
Wilson	83	30	52.2	0.84
Yates Centre	85	27	53.4	1.96
Kentucky.				
Bowling Green	77	32	56.5	2.07
Falmouth	76	31	50.6	3.39
Frankfort	79	29	50.9	3.51
Madisonville	78	34	54.1	1.09
Millersburgh	74	35	53.5	2.58
Owenton	76	36	54.5	2.07
Pellville	.....	.....	.....	4.95
Whitesburgh	83	33	52.0	7.58
Louisiana.				
Abbeville	85	52	72.5	5.34
Cheneyville	83	48	62.1	3.30
Clinton	85	45	65.6	4.75
Convent	84	50	67.3	3.71
Coushatta	86	38	63.8	0.54
Crowley	88	46	69.1	4.68
Donaldsville	84	47	67.4	4.64
Farmersville	87	41	†	1.50
Franklin	82	49	68.3	4.85
Girard	.....	.....	.....	1.57
Grand Coteau	85	51	67.2	3.82
Hahnville	89	46	69.4	4.85
Houma	84	48	71.6	5.27
Lake Providence	90	.....	.....	1.73
Liberty Hill	92	38	66.0	3.00
Mandeville	84	47	68.2	3.58
Maurepas	86	48	67.8	4.47
Marksville	86	46.5	65.1	3.62
Minden	88	40	65.8	1.79
Monroe	87	42	62.4	1.86
Mount Airy	92	50	70.2	5.40
Natchitoches	87	43	65.6	1.95
New Iberia	91	51	72.0	3.66
Point Pleasant	84	46	63.6	3.45
Port Eads	81	58	73.5	3.93
Saint Joseph	86	39	64.7	4.00
Saint Martinville	84	53	68.0	.....
Shell Beach	85	57	72.5	4.23
Sugar Ex. Station	83	33	63.3	1.40
Thibodeaux	.....	.....	.....	4.28
Trinity	88	45	66.4	3.30
Vidalia	88	42	61.1	2.77
West Melville	86	43	67.2	3.88
Maine.				
Bar Harbor	58	31	44.2	7.84
Belfast	56	35	42.9	.....
Calais	64	27	43.8	8.72
Cornish	54	26	40.6	6.57
Fairfield	59	26	42.2	5.44
Fort Preble	.....	.....	.....	5.71
Gardiner	60	30	42.9	6.71
Kent's Hill	59	28	41.6	6.03
Lewiston	58	30	42.9	6.04
Mayfield	56	23	36.9	7.93
Orono	60	27	42.1	7.51
Petit Manan	57	33	42.8	.....
Maryland.				
Barren Creek Sp'gs.	71	31	51.7	5.21
Cumberland	72	32	48.0	2.60
Fort McHenry	72	37	57.0	3.68
Galena	62	42	51.1	3.97
Gaithersburgh	66	35	46.1	.....
Gambrill's	73	36	55.0	1.30
Great Falls*	72	32	51.3	2.94
Jewell*	71	38	52.4	5.57
McDonogh	65	35	50.1	3.59
Mt. St. Mary's Col	69	33	50.3	1.35
Woodstock	70	29	49.0	3.30
Massachusetts.				
Amherst *a*	66	26	43.1	5.19
Amherst *b*	64	26	43.6	5.60
Beverly Farm	64	27	43.0	5.16
Blue Hill Observ'ry *a*	64	27	43.9	4.66
Blue Hill Observ'ry *b*	65	29	45.1	4.88
Blue Hill Observ'ry *c*	67	27	45.3	4.75
Cambridge *a*	63	31	46.6	4.67
Cambridge *b*	67	31	46.4	4.83
Chestnut Hill	68	26	46.2	4.54

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.) Max.	Min.	Mean.	Precip'n.
Massachusetts—Con.	°	°	°	*Ins.*
Chicopee	.....	.....	.....	5.58
Clinton	.....	.....	.....	6.08
Cotuit	66	28	47.0	4.34
Deerfield *a*	66	26	43.6	6.31
Deerfield *b*	66	28	44.2	.....
Dudley	66	26	41.2	6.26
Fall River	63	30	46.2	3.45
Framingham	67	28	46.4	5.29
Fiskdale	.....	.....	.....	4.84
Fitchburg *a*	63	31	42.4	5.40
Fitchburg *b*	63	30	43.2	5.92
Gilbertville	63	24	41.7	5.14
Groton *a*	64	28	44.7	6.43
Groton *b*	65	23	42.8	.....
Lake Cochituate	69	21	46.4	4.95
Lawrence	65	30	44.5	5.92
Leicester	62	30	43.0	6.08
Leominster	.....	.....	.....	6.05
Long Plain	64	27	†	3.88
Lowell	65	29	45.1	6.78
Ludlow	65	22	42.2	5.65
Lynn	65	32	45.2	5.40
Mansfield	64	24	44.2	5.41
Medford	.....	.....	.....	4.73
Middleborough	64	24	45.5	3.50
Milton	66	31	45.0	4.24
Monson	65	23	45.0	4.95
Mt. Nonotuck	.....	.....	.....	5.13
Mystic Lake	.....	.....	.....	5.04
Mystic Station	.....	.....	.....	4.87
New Bedford *a*	64	29	47.4	2.66
New Bedford *b*	64	28	47.2	3.07
Newburyport *a*	66	30	45.1	5.66
Newburyport *b*	.....	.....	.....	5.35
Northampton	64	28	44.5	5.95
Plymouth	71	34	48.9	3.49
Princeton	61	25	42.1	5.67
Provincetown*	65	33	47.7	3.98
Rowe	65	27	42.5	5.50
Salem *a*	66	33	44.6	.....
Salem *b*	.....	.....	.....	4.94
Somerset	71	26	48.8	3.09
South Hingham	.....	.....	.....	4.68
Sprinfield	65	30	45.4	5.50
Swampscott	65	32	†	.....
Taunton *a*	68	28	46.9	4.69
Taunton *b*	66	27	45.6	4.90
Taunton *c*	66	24	46.0	4.79
Waltham	.....	.....	.....	4.65
Warwick	61	26	41.7	.....
Wellesley	66	23	44.9	4.68
Westborough	70	30	47.7	4.69
Winchester	.....	.....	.....	4.87
Worcester	65	30	44.9	.....
Michigan.				
Adrian	75	24	45.6	1.64
Alma	72	23	44.8	2.00
Albion	72	30	49.3	1.84
Atlantic	60	23	37.7	2.18
Bear Lake	60	26	43.3	2.37
Bell Branch	72	22	46.8	2.25
Benzonia	61	28	41.7	2.37
Berlin	70	22	45.4	2.40
Big Rapids	67	22	44.3	1.80
Birmingham	71	21	45.3	2.54
Bronson	58	30	43.5	1.92
Buchanan	72	31	45.0	2.16
Calumet	57	26	39.6	3.48
Cassopolis	72	30	47.7	2.32
Chelsea	70	30	45.9	.....
Coldwater	72	29	47.0	2.27
Colon	73	28	46.0	2.08
Columbiaville	71	27	46.4	2.02
Concord	72	26	46.2	2.22
Corunna	73	24	45.7	1.39
Deer Lake	62	24	43.2	2.43
Eden	71	26	45.8	1.99
East Saginaw	72	26	44.1	2.10
Fletcher	64	24	41.6	3.20
Fort Brady	63	21	41.1	2.32
Fort Mackinac	66	28	43.9	.....
Fremont	66	30	45.9	1.51
Grand Rapids	71	26	48.2	0.73
Gull Lake	60	23	42.1	3.84
Hanover	70	28	46.9	2.60
Harrisville	65	26	43.7	3.42
Hart	72	25	46.4	1.15
Hastings	71	26	47.0	3.02
Highland Station	72	30	43.4	2.84
Hudson	73	20	.....	2.18
Ionia	72	25	47.3	2.09
Kalamazoo *a*	70	33	51.5	2.46
Kalamazoo *b*	70	28	47.4	2.46
Lansing	73	26	46.3	3.03
Lathrop	64	22	40.5	2.30
Madison	72	27	45.8	1.83
Marshall	73	27	48.2	2.37
May	69	30	42.4	2.49
Mio	65	24	42.0	1.92
Montague	.....	.....	.....	2.04
Mottville*	75	27	48.3	1.97
Noble	.....	.....	.....	2.30
Olivet	72	28	45.4	2.63
Ovid	71	26	45.4	2.13
Petersburgh	76	25	46.3	1.98
Pontiac	68	32	47.5	3.14
Pulaski	72	31	46.8	2.49
Saint Johns	72	26	46.3	2.34
Sand Beach	72	30	46.8	2.20
Thornville *	73	27	45.9	2.79
Traverse City *a*	66	25	46.0	2.03
Traverse City *b*	64	28	44.5	2.48
Washington	67	25	44.9	2.42
Williamstown	72	38	47.9	3.25
Ypsilanti	72	24	45.0	2.52
Minnesota.				
Argyle	75	21	40.0	1.80
Delano	75	24	43.9	0.99
Fort Snelling	76	27	45.5	1.00
Grand Meadow	73	26	43.0	0.42
L. Winnibigoshish	71	25	41.6	1.89
Leech Lake	69	24	39.1	2.37
Le Sueur	70	25	45.0½	0.96
Mankato	75	30	45.8	1.49
Medford	76	22	42.5	1.39
Minneapolis	73	30	44.1	0.99
Morris	75	24	42 4	0.91
Northfield	74	26	44.6	1.46
Pine River	72	27	42.8	1.96
Pokegama Falls	69	18	38.3	1.68
Red Wing	71	30	44.0	1.63
Rolling Green	72	29	44.3	0.57
Saint Cloud	75	27	43.8	.....
Winona	71	22	†	.....
Mississippi.				
Aberdeen	83	38	61.0	2.15
Artonish Plantation	86	45	67.0	3.04
Biloxi	80	51	68.8	4.85
Brook Haven	88	41	66.0	3.08
Columbus	85	40	63.0	3.43
Edwards	85	43	64.0	.....
Hazelhurst	88	48	66.0	0.23
Holly Springs	81	38	59.0	2.10
Jackson	82	41	61.0	.....
Lake	86	40	64.0	.....
Lamar	78	46	62.0	.....
Logtown	87	51	68.0	.....
Macon	85	38	63.0	1.99
Meridian	86	38	63.0	3.90
Natchez	87	42	65.0	2.96
Okolona	83	38	62.0	1.65
Palo Alto	84	40	61.8	3.20
Pearlington	82	51	68.0	.....
Port Gibson	88	49	65.0	2.66
Starkville	80	40	63.0	2.99
Water Valley	.....	.....	.....	2.22
Waynesborough	86	45	66.0	3.37
Yazoo City	.....	.....	.....	2.67
Missouri.				
Arlington	.....	.....	.....	3.60
Carthage	.....	.....	.....	3.49
Conception	80	26	50.9	0.88
Excelsior Springs*	87	28	51.5	2.65
Fayette	84	27	54.5	2.59
Fox Creek	82	34	55.1	3.76
Frankford *	88	30	†	0.57
Glasgow	83	30	52.7	2.17
Grand Pass	.....	.....	.....	2.12
Harrisonville	.....	.....	.....	2.82
Hermann	.....	.....	.....	2.91
Ironton	79	24	47.0	2.40
Kansas City	86	28	53.9	3.75
Lakenan *	80	34	53.8	1.50
Lamonte	89	32	58.1	2.33
Mexico	.....	32	.....	1.57
New Frankfort	84	30	.....	.....
Oregon	82	29	53.0	2.03
Ozark	82	28	54.1	2.50
Princeton	84	30	52.2	1.05
Saint Charles *a*	.....	.....	.....	1.50
Saint Charles *b*	86	32	53.7	2.66
Sedalia	84	32	57.2	3.22
Shelbina	.....	.....	.....	1.80
Steelville	86	26	.....	2.53
Warrenton	.....	.....	50.5	.....
Warrensburg	84	29.5	52.4	2.34
Montana.				
Fort Assinaboine	76	16	45.9	0.34
Fort Custer	77	16	47.9	0.66
Fort Keogh	78	14	50.6	0.27
Fort Maginnis	83	18	46.8	0.57
Fort Missoula	80	24	47.5	0.28
Fort Shaw	83	18	48.2	0.11
Virginia City	72	16	54.0	0.23
Nebraska.				
Ashland	.....	.....	.....	1.43
Crete	80	24	50.4	2.03
Creighton	80	17	46.2	.....
Culbertson*	86	18	53.6	0.83
David City	82	18	48.9	.....
De Soto *	77	27	49.4	1.00
Fairbury	.....	.....	.....	2.04
Falls City	80	26	51.9	1.71
Fort Niobrara	83	12	48.6	0.74
Fort Robinson	80	16	48.4	T.
Fort Sidney	77	14	47.9	0.72
Fremont	78	22	47.9	0.91
Genoa	74	22	48.4	0.68
Hay Springs	76	17	44.0	0.15
Marquette *	85	25	†	0.87

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.) Max.	Min.	Mean	Precip'n.
Nebraska—Cont'd.	°	°	°	*Ins.*
Minden	76	30	51.2	1.55
Nebraska City	77	26	50.1	2.34
North Loup	82	17	45.0	.....
Palmer	80	12	42.2	1.00
Ravenna	83	12	†	1.31
Red Willow	.....	.....	.....	1.12
Scribner	81	13	45.3	0.83
Syracuse	80	27	51.1	2.04
Tecumseh	76	23	46.0	2.45
Weeping Water	83	22	46.8	1.86
West Hill	76	20	48.9	0.85
West Point	76	28	†	1.20
Nevada.				
Austin	78	26	.....	.....
Battle Mountain	.....	.....	49.7	0.18
Beowawe	.....	.....	53.3	0.33
Brown	.....	.....	56.2	0.05
Dayton	80	26	54.5	.....
El Dorado Canyon	100?	53?	76.2?	0.14
Fort McDermitt	86	26	52.7	0.92
Genoa	79	28	.....	.....
Golconda	.....	.....	54.6	0.65
Hot Springs	.....	.....	57.3	0.17
Humboldt	.....	.....	51.5	.....
Lewer's Ranch	82	27	56.0	T.
Mill City	.....	.....	53.5	.....
Palisade	.....	.....	48.4	0.30
Pioche	82	24	51.6	0.16
Reno State Univ's'y	83	26	53.8	T.
Rioville	.....	.....	.....	0.01
Tuscarora	73	18	46.4	0.71
New Hampshire.				
Antrim	.....	.....	.....	6.10
Belmont	.....	.....	.....	5.71
Berlin Falls	71	8	39.9	.....
Berlin Mills	66	21	40.4	3.86
Bristol	.....	.....	.....	5.62
Concord	64	26	43.8	5.63
Hanover	58	25	40.5	4.05
Lake Village	.....	.....	.....	5.71
Manchester *a*	66	26	43.7	6.03
Manchester *b*	66	27	43.1	6.19
Mine Falls	.....	.....	.....	5.91
Nashua	67	25	44.0	6.35
North Conway	61	23	41.6	8.48
Pennichuck	.....	.....	.....	6.61
Plymouth	58	22	40.2	5.18
Shaker Village	60	25	41.0	4.14
Stratford	63	22	40.8	3.44
Walpole	63	26	38.5	9.92
West Milan	58	19	38.2	4.68
Wier's Bridge	.....	.....	.....	5.66
Wolfborough	.....	.....	.....	6.13
New Jersey.				
Beverly	68	30	49.7	4.00
Billingsport L. H.	66	36	51.8	5.15
Bridgeton	73	38	53.4	.....
Clayton *	76	32	49.4	4.72
Egg Harbor City	71	27	49.0	5.02
Freehold	72	30	48.6	2.97
Gillette	67	27	47.0	3.52
Hanover	64	25	44.0	4.32
Highland Park	68	29	47.8	5.58
Imlaystown	69	30	48.2	4.00
Madison	70	27	47.1	4.72
Moorestown	66	31	48.6	4.14
New Brunswick *a*	66	35	†	5.55
New Brunswick *b*	68	30	48.8	5.62
Newark	69	34	50.0	4.04
Ocean City	69	35	54.3	7.00
Oceanic	72	34	51.2	4.05
Paterson	67	34	49.3	4.10
Plainfield	70	34	48.3	5.30
Rancocas	.....	32	.....	4.51
Readington *	72	34	50.5	.....
Somerville	66	31	47.2	4.01
South Orange	66	30	47.6	5.86
Tenafly	70	27	47.0	5.53
Tom's River	71	30	49.2	4.39
Trenton	71	37	†	5.50
Union	66	31	47.1	5.22
New Mexico.				
Coolidge	76	25	49.5	0.90
Fort Bayard	92	40	63.9	3.00
Fort Selden	96	30	63.3	7.55
Fort Union	73	25	46.8	0.82
Fort Wingate	75	23	50.6	0.50
Gallinas Spring	78	32	56.1	1.70
Las Vegas	74	24	45.2	0.40
New York.				
Ardenia	67	34	48.0	4.64
Auburn	65	31	46.2	4.56
Boyd's Corners *	63	34	47.0	4.80
Carmel	65	26	45.6	4.39
Central Park	66	33	48.6	4.33
Cooperstown	61	27	41.5	4.09
David's Island	67	31	54.8	3.39
Eden	64	30	42.0	3.40
Factoryville	62	24	44.2	3.15
Fort Columbus	68	34	50.3	4.11
Fort Hamilton	65	35	49.2	3.62
Fort Niagara	69	36	47.0	.....
Fort Wadsworth	69	30	48.7	.....
Friendship	.....	.....	37.8	4.10
Geneva	70	26	43.3	3.53
Humphrey	75	29	43.6	4.27
Ithaca	64	26	44.0	4.48
Le Roy	72	27	42.7	4.07
Lyons	69	31	44.7	3.68
Madison Barracks	69	22	43.0	4.49
Middleburgh	68	30	43.7	4.60
Palermo *	69	23	43.9	2.30
Palmyra	71	30	45.8	.....
Penn Yan	.....	.....	.....	3.74
Plattsburgh B'ks	56	26	42.0	2.98
Rose	70	.....	42.2	4.17
Savona	68	27	43.9	3.49
S. E. Reservoir	.....	.....	.....	4.89
Setauket	66	33	50.0	4.76
Troy	62	30	43.4	3.26
Utica	64	22	41.3	4.97
West Point	65	28	44.0	3.94
White Plains	65	29	48.9	4.25
North Carolina.				
Chapel Hill	80	33	56.1	1.81
Goldsborough	80	39	58.9	4.73
Hot Springs	72	32	53.7	.....
Lenoir	74	34	52.3	5.70
Lumberton	80	34	58.8	2.64
Mount Pleasant	79	32	54.8	7.09
Monroe	76	37	56.7	4.76
New Berne	80	40	62.0[8]	5.76
Statesville*	74	35	53.7	5.68
Wadesborough	78	30	57.3	2.30
Weldon*	77	33	55.2	3.31
Ohio.				
Akron	72	29	45.7	3.03
Ashland	.....	.....	.....	2.87
Athens	72	29	48.8	5.59
Bangorville	76	26	45.0	3.47
Bellevue	74	29	46.1	.....
Celina	77	29	48.3	4.35
Circleville	.....	.....	.....	5.47
Clarksville	74	31	49.3	3.97
Cleveland	75	31	48.3	3.41
College Hill*	74	36	51.7	7.00
Collinwood	67	38	49.0	3.01
Dayton	76	27	49.2	5.14
Demos	.....	.....	46.8	4.17
Ellsworth	.....	.....	.....	3.20
Elyria	74	30	48.5	3.33
Fostoria	76	26	48.3	.....
Gracey	.....	.....	.....	5.50
Garrettsville	72	23	44.0	3.36
Georgetown	77	30	49.9	4.70
Greenville	75	28	46.0	4.50
Hanging Rock	79	28	48.6	4.09
Hiram	70	31	45.3	3.20
Hudson	.....	.....	.....	3.84
Jacksonborough	76	33	48.9	3.88
Jefferson	73	29	44.9	3.27
Logan	79	27	48.2	5.15
Lordstown	70	26	46.7	3.75
Marietta	74	30	49.6	5.71
McConnelsville	74	26	50.3	5.04
Napoleon	75	29	57.2	1.71
New Alexandria	71	27	47.3	4.12
New Athens	70	30	45.9	.....
New Comerstown	79	22	40.3	4.15
North Lewisburgh	80	29	49.2	4.85
Oberlin	72	29	46.7	2.63
O. S. University	78	25	47.4	5.14
Ottawa	.....	.....	.....	2.22
Portsmouth	79	32	51.1	4.51
Ruggles*	70	30	46.1	1.80
Sidney	78	29	47.8	5.59
Springborough	.....	.....	.....	2.38
Tiffin *	72	31	47.3	2.09
Upper Sandusky	74	28	47.4	2.38
Wapakoneta	75	27	47.4	2.89
Wauseon†	76	23	46.0	1.93
Waynesville	.....	.....	.....	5.27
Westerville	76	30	46.8	4.55
West Milton	75	30	50.6	10.00
Weymouth	.....	.....	.....	3.47
Wooster	.....	27	44.9	3.18
Yellow Springs	74	26	47.1	5.42
Youngstown	73	34	48.9	3.98
Oregon.				
Albany	84	34	54.9	3.26
Bandon *	73	41	54.1	0.44
East Portland*	74	38	†	5.06
Eola	74	36	54.6	2.72
Fort Klamath	83	13	47.6	0.19
McMinnville	77	31	53.6	3.69
Mount Angel	77	35	55.2	5.43
Pennsylvania.				
Altoona	71	34	49.5	2.90
Beaver	73	31	46.0	3.02
Bethlehem	64	29	49.0	2.77
Carlisle	70	32	49.1	3.19
Catawissa	67	31	52.3	3.82
Charlesville	73	26	46.5	2.52
Clarion	68	19	44.3	5.15
Coatsville	71	26	47.4	2.93
Corry*	74	24	35.8	4.22
Coudersport	68	21	43.2	4.60
Drifton	65	28	44.1	4.75
Dyberry	62	22	41.3	3.97
Eagle's Mere	54	26	40.5	9.18

Meterological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.) Max.	Min.	Mean	Precip'n.
Pennsylvania—Con.	°	°	°	*Ins.*
Easton	.....	.....	.....	2.97
Emporium	69	26	46.7	4.15
Franklin *	.....	.....	43.9	4.58
Germantown	64	32	47.8	4.85
Girardville	64	30	45.9	4.83
Grampian Hills	68	28	43.4	4.50
Greenville	71	20	45.3	3.16
Hollidaysburgh	74	28	47.0	3.85
Huntingdon	71	29	46.8	3.49
Indiana	72	26	46.3	5.48
Kutztown	60	28	44.1	3.62
Lancaster	68	30	48.0	3.14
Lebanon	69	30	47.5	3.22
Lock Haven	66	25	45.8	5.22
Meadville	71	.....	.....	4.58
McConnellsburgh	74	28	47.9	3.62
New Bloomfield	70	29	45.1	3.98
New Castle	73	25	48.4	3.99
Philipsburgh	71	27	42.5	4.46
Pottstown	64	28	49.2	2.82
Quakertown	64	26	45.8	3.72
Reading	68	27	47.7	3.77
Rimersburgh	69	30	44.0	.....
Salem Corners	54	32	41.7	4.13
Scranton	62	31	46.4	5.48
Selins Grove	69	32	46.7	.....
Shamokin	66	26	46.4	2.75
Smethport	72	30	43.2	7.66
Somerset	71	26	42.9	5.47
State College	67	29	45.5	3.76
Swarthmore	66	30	49.0	4.75
Tionesta	71	31	44.3	4.70
Troy	62	30	43.4	3.26
Uniontown	71	29	50.5	5.16
Wellsborough	66	24	46.6	6.69
West Chester	67	31	48.6	3.11
Wysox	62	25	43.8	3.24
Rhode Island.				
Bristol	63	33	48.3	2.74
Kingston	.....	.. ..	.....	3.54
Lonsdale	.....	.....	.....	6.33
Newport	64	34	49.8	.....
Olneyville	70	32	49.3	....
Pawtucket	.....	.....	.....	5.76
Providence a	65	34	47.4	5.37
Providence b	70	29	46.7	5.43
Woonsocket	64	27	45.8	4.34
South Carolina.				
Abbeville	77	40	57.8	2.27
Aiken	78	44	61.7	5.49
Allendale	84	41	63.5	7.83
Batesburgh	80	40	61.2	5.18
Blackville	80	39	59.5	4.48
Branchville	88	40	62.6	2.38
Brewer's Mines	80	39	.....	4.11
Camden	67	39	54.4	3.67
Cedar Springs	83	31	53.0	4.35
Cheraw	83	32	58.2	2.34
Chester	80	38	59.9	3.88
Clinton	78	42	†	3.92
Evergreen	.....	.....	59.7	4.06
Florence	82	39	61.8	3.76
George's	82	37	62.6	5.69
Greenwood	77	33	60.7	3.27
Hardeeville	85	40	65.1	6.22
Jacksonborough	81	39	62.4	5.60
Kingstree	86	39	65.8	3.59
Marion	82	42	†	3.41
Newberry	77	41	58.8	4.51
Saint Matthews	85	40	62.6	4.00
Spartanburgh	77	35	56.0	3.20
Statesburgh *	79	42	59.8	3.05
Timmonsville	76	43	60.2	2.01
Trial	.....	.....	58.5	4.75
Winnsborough	79	36	60.0	4.65
Yorkville	84	36	59.0	4.50
Tennessee.				
Andersonville	78	34	53.6	7.22
Ashwood	78	38	42.6	3.40
Austin	80	36	52.5	3.67
Covington	80	40	57.5	4.06
Fayetteville	78	34	55.3	3.29
Florence Station	78	40	56.0	3.04
Fostoria	76	33	51.6	5.50
Greeneville	77	34	52.0	5.40
Hohenwald	82	30	53.3	3.98
Jacksborough	77	30	53.5	5.33
Kingston Springs	80	34	55.4	4.12
Lawrenceburgh	77	29	52.6	.....
Lewisburgh	70	36	55.4	2.56
McKenzie	84	40	56.3	1.46
Milan	81	34	56.0	3.01
Nunnelly	80	31	54.4	3.03
Parksville	75	35	55.6	4.49
Riddleton	79	33	54.4	5.19
Rogersville	75	32	51.4	6.58
Springdale	80	32	51.4	6.60
Trenton	79	34	54.9	2.85
Texas—Cont'd.				
Watkins	81	37	56.6	2.41
Waynesborough	82	32	55.6	2.60
Texas.				
Austin	87	42	69.1	4.45
Belton	88	43	69.4	2.49
Brenham	90	48	71.3	2.77
Brady	85	37	62.8	2.40
Cedar Hill	85	40	67.5	1.00
Cleburne *	83	33	62.2	2.35
College Station	91	43	67.0	1.81
Columbia	88	51	71.0	3.00
Corsicana	90	35	67.7	1.03
Dallas	87	38	67.2	0.50
Decatur	86	38	63.1	1.49
Fort Clark	85	46	68.4	2.26
Fort Concho	93	45	67.8	1.72
Fort Davis	83	37	61.7	1.70
Fort Elliott	89	34	54.0	0.72
Fort McIntosh	91	49	74.8	0.37
Fort Ringgold	96	49	76.2	.....
Gallinas	90	38	69.0	1.46
Granbury	88	41	.....	2.80
Hearne	88	38	68.1	1.40
Houston	89	51	71.1	4.92
Huntsville	92	47	71.2	2.59
Lampasas	90	32	67.9	1.13
Longview	90	39	66.8	1.86
Lulling	90	41	70.3	1.37
Mesquite	90	34	64.2	0.63
Mexia	87	45	64.0	0.55
New Ulm	90.5	46.5	68.5	3.50
Orange	88	48	69.1	2.94
Silver Falls	90	35	62.3	1.88
Sour Lake	90	45	64.6	4.50
Tyler	89	36	66.1	0.75
Waco	87	37	68.6	0.60
Weatherford	89	35	63.8	0.00
Vermont.				
Brattleborough a	67	25	42.3	6.12
Brattleborough b	66	28	42.5	.....
Burlington	60	28	42.8	3.94
Chelsea	54	24	38.1	3.87
Cornwall	.....	.....	.....	4.44
Coventry	56	22	38.4	5.95
East Berkshire	55	27	37.0	4.23
Jacksonville	65	23	39.4	6.86
Lunenburgh	62	20	40.7	5.25
Manchester	62	28	41.8	5.65
Middlebury *	60	29	41.6	4.78
Newport	58	29	41.5	6.20
Saint Johnsbury	58	23	38.6	4.19
Strafford *	56	26	40.6	4.85
Vernon	64	26	43.9	6.71
Virginia.				
Bird's Nest *	76	34	55.4	2.21
Christiansburgh	70	29	47.8	4.28
Dale Enterprise *	75	28	54.5	2.90
Fort Monroe	79	39	55.9	2.37
Marion	73	30	48.0	5.94
Spottsville *	73	32	54.5	3.05
Summit *	72	26	51.0	.....
University of Va	.....	.....	.....	3.44
Wytheville	68	32	46.3	5.05
Washington Territory				
Blakeley	70	35	52.0	4.05
Fort Spokane	90	23	50.8	1.38
Fort Townsend	68	31	49.3	2.65
Fort Walla Walla	81	28	50.3	2.22
Tacoma	67	34	55.5	3.60
Vancouver B'ks	75	29	53.0	.....
Vashon	70	40	54.3	3.60
West Virginia.				
Hartmonsville *	68	30	44.4	.....
Helvetia *	.....	.....	45.4	8.14
Middlebrook *	68	25	42.3	4.00
Parkersburgh	72	29	44.2	5.15
White Sulph. Sp'gs	.....	.....	.....	6.02
Wisconsin.				
Cadiz	.....	22	.....	3.25
Delavan	75	21	44.8	1.79
Deuster	.....	.....	.....	1.08
Fond du Lac	71	24	45.5	1.27
Fredonia *	70	26	39.7	.....
Madison	72	28	46.2	1.68
Manitowoc *	72	25	46.1	0.96
Weston	.....	30	41.3	1.75
Wyoming.				
Camp Sheridan	74	13	42.5	.....
Camp Pilot Butte	74	19	45.5	0.00
Fort Bridger	.....	13	.....	0.10
Fort Laramie	84	.....	.....	0.02
Fort McKinney	72	19	46.8	0.16
Fort Washakie	70	13	45.1	0.44

† No data. ‡ Means from observations at 7 a. m. and 2 p. m.
§ 27 days record.
‖ 23 days record.

Mean temperature, in degrees Fahrenheit, at Amherst College, Massachusetts, as furnished by the late Prof. E. S. Snell, from 1836 to 1882, inclusive, and by the Agricultural Experimental station from 1883 to date.

Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
1836	23.1*	24.7*	32.7	47.3	61.4	66.4	73.6	68.0	62.4	47.9	38.2	29.2	47.9
1837	20.3	26.7	33.7	47.4	57.9	68.2	70.6	68.6	61.4	50.0	40.2	27.6	47.7
1838	32.0	19.6	30.4	40.7	54.3	68.6	71.9	68.2	62.7	46.5	34.1	23.5	46.5
1839	24.6	29.8	37.5	52.2	60.7	65.4	74.4	70.7	63.5	53.3	36.6	28.9	49.8
1840	14.4	28.5	35.0	49.0	57.1	65.5	70.6	70.3	57.2	47.4	37.0	23.6	46.3
1841	25.6	20.2	31.9	41.6	54.4	68.4	69.5	69.8	61.2	42.8	35.3	29.5	48.8
1842	25.6	30.5	37.7	46.5	62.7	64.1	71.5	69.1	57.4	47.4	35.1	24.2	46.8
1843	29.7	16.5	24.5	44.6	56.0	65.3	68.8	69.8	61.7	45.0	34.0	28.0	45.3
1844	13.9	22.1	35.5	52.0	57.8	65.6	68.2	68.0	59.6	47.6	35.7	27.3	45.9
1845	24.5	24.9	36.9	45.6	56.2	66.7	72.1	71.5	58.3	49.6	41.5	21.5	47.4
1846	24.8	20.1	36.3	50.1	58.3	65.0	70.7	69.6	65.5	47.6	43.1	25.3	48.0
1847	25.5	24.7	29.2	43.3	57.5	64.7	72.4	69.3	59.3	46.0	43.2	34.2	47.4
1848	29.0	23.7	32.6	43.3	59.5	67.6	69.4	70.6	57.4	47.3	33.5	30.6	47.0
1849	20.0	18.5	35.6	43.5	53.4	66.9	72.1	68.8	60.0	47.0	44.1	28.4	46.5
1850	25.9	28.4	32.4	42.9	53.4	67.3	72.1	67.1	59.4	48.2	40.0	23.4	46.7
1851	23.8	27.9	35.5	46.2	55.6	63.6	69.1	66.2	60.9	51.0	34.5	20.1	46.2
1852	19.6	25.2	30.9	39.4	56.0	65.4	70.0	65.2	58.4	49.3	36.4	32.8	45.7
1853	24.3	26.7	33.8	44.0	56.7	67.0	68.7	67.8	59.5	46.8	39.1	36.3	46.6
1854	22.8	22.0	31.6	43.5	59.5	66.7	74.1	68.8	61.5	51.5	40.3	22.3	47.0
1855	27.3	19.8	31.5	43.8	56.6	65.0	70.9	65.5	60.8	49.7	38.8	28.2	46.5
1856	15.2	19.0	25.9	46.4	53.6	68.6	72.9	66.2	60.8	48.7	37.5	23.2	44.8
1857	13.5	31.4	31.1	41.0	55.2	63.6	70.9	67.2	59.9	48.9	39.5	31.5	46.1
1858	28.8	20.6	31.3	44.4	54.1	66.1	69.8	67.9	55.9	51.4	33.9	25.7	45.4
1859	22.9	25.6	36.7	43.4	59.2	62.8	67.7	66.4	57.1	45.7	41.1	23.0	46.0
1860	26.5	24.8	37.2	44.0	57.3	65.2	66.4	68.0	56.8	48.8	42.7	23.9	46.8
1861	20.4	29.2	32.5	45.5	53.4	65.5	69.5	65.7	59.9	51.5	37.8	29.0	46.7
1862	22.3	22.1	32.2	43.6	58.1	63.4	68.0	68.1	61.1	51.0	39.6	27.6	46.4
1863	29.1	26.3	36.1	45.5	55.4	68.0	70.9	70.1	57.4	49.9	41.1	25.3	46.3
1864	24.4	28.5	34.4	43.5	60.4	65.7	71.5	70.8	57.8	46.4	38.0	30.2	47.6
1865	18.7	25.0	37.1	49.0	57.1	69.3	69.1	68.6	65.6	46.0	39.9	28.9	47.9
1866	21.9	26.2	31.6	48.6	54.6	65.8	72.9	63.5	60.0	49.5	40.1	26.3	46.8
1867	18.3	31.2	30.8	45.5	54.0	67.1	68.1	68.6	60.0	49.9	37.9	22.6	46.2
1868	20.2	18.2	33.8	42.0	55.1	66.2	74.0	69.0	59.5	45.3	36.5	22.8	45.2
1869	28.0	28.0	27.3	46.4	55.9	64.7	69.1	66.9	62.1	46.7	35.9	27.5	46.5
1870	30.8	25.3	30.9	48.3	58.3	70.4	73.6	71.1	62.3	52.0	39.1	28.0	49.2
1871	23.3	26.0	40.5	48.0	57.8	65.4	69.2	68.9	52.8	51.0	34.0	24.6	46.8
1872	25.1	24.2	25.3	45.0	59.1	68.1	72.6	71.8	61.7	48.2	36.4	19.5	46.4
1873	20.6	24.0	30.6	43.2	54.6	67.5	71.3	67.0	60.4	49.9	29.7	29.2	45.7
1874	28.2	24.5	32.9	38.3	56.5	66.2	67.2	65.6	62.0	47.6	36.2	29.3	46.2
1875	16.7	17.5	27.8	40.8	57.1	65.8	69.3	68.9	57.3	47.9	33.1	28.3	44.2
1876	29.8	26.4	31.6	43.6	57.5	70.6	74.2	70.5	59.1	45.5	40.5	19.7	47.4
1877	20.0	30.8	33.3	47.8	58.5	67.8	71.1	71.4	63.3	50.5	41.9	33.1	49.1
1878	25.3	27.1	39.2	52.2	57.4	64.7	73.3	68.6	63.2	54.4	39.1	29.0	49.5
1879	21.6	22.4	33.0	43.2	60.6	66.3	71.0	67.2	59.0	56.0	37.4	30.8	47.4
1880	31.6	29.1	33.5	47.5	64.2	68.5	71.8	67.5	63.2	47.3	34.9	22.8	48.5
1881	17.9	24.9	30.2	43.6	61.7	62.8	70.6	70.5	67.4	52.5	40.3	36.0	48.7
1882	23.6	28.2	35.1	44.3	52.9	66.8	71.9	70.9	63.2	52.7	36.4	26.6	47.7
1883	21.0	25.0	27.3	44.3	58.6	69.7	70.4	66.4	59.4	46.8	40.4	27.0	46.4
1884	21.6	30.9	32.9	46.7	57.4	69.0	68.6	69.2	64.4	50.3	38.4	30.0	48.3
1885	22.7	15.2	33.3	45.3	54.8	63.8	70.4	66.0	58.3	49.1	39.8	29.6	44.9
1886	21.8	23.1	33.5	50.4	57.3	63.2	68.8	66.3	59.5	48.9	38.3	23.0	46.2
1887	19.4	24.2	26.4	41.6	60.9	65.7	73.7	64.9	55.9	47.0	36.5	26.6	45.2
1888	13.8	24.8	28.7	42.9	54.7	65.8	67.2	67.9	.....	.....	.....	.....	.....
Mean..	23.1	24.7	32.5	45.1	56.9	66.1	70.7	68.3	60.2	49.0	38.0	26.8	46.9

*Interpolated.

Precipitation (in inches and hundredths) observed by assistant surgeons, U. S. Army, at Fort Union, N. Mex.

1851	.....	.....	.....	.....	.....	.....	.....	.....	4.63	0.61	1.97	0.33	.....
1852	0.48	0.59	0.00	0.24	0.73	7.05	2.73	5.49	3.04	3.44	2.83	0.02	26.64
1853	0.29	0.08	0.77	0.32	0.91	0.11	4.19	3.42	1.59	1.29	0.38	0.18	13.43
1854	0.07	0.02	0.63	0.46	0.50	0.69	3.98	1.75	2.99	0.88	1.80	0.60	14.37
1855	0.00	0.00	0.40	0.00	2.88	2.12	4.37	1.46	3.83	0.40	2.20	0.91	18.57
1856	0.76	1.08	1.11	1.06	0.56	0.65	3.39	6.74	4.04	0.00	0.70	0.12	20.21
1857	0.70	0.11	0.12	0.98	0.25	2.49	4.03	2.96	4.33	3.32	1.10	0.55	20.94
1858	1.13	1.36	1.15	0.40	1.20	3.20	5.80	5.71	0.40	0.30	0.72	1.42	22.79
1859	0.25	0.00	1.00	0.65	0.00	4.80	5.76	7.18	3.55	1.10	0.00	0.25	24.54
1860	1.28	0.92	0.00	0.44	0.00	3.45	1.54	3.95	1.50	0.00	0.56	0.80	14.44
1861	1.09	0.20	0.00	0.64	0.00	4.14	17.30	14.80	0.80	.....	.....	0.00	.....
1862	0.20	0.12	0.76	0.36	1.18	2.39	12.60	3.30	0.00	0.00	0.29	0.25	21.37
1863	0.75	0.00	0.65	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1866	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.32	.....	.....	.....
1867	.....	.....	0.00	0.18	0.67	0.17	0.90	.....	.....	.....	.....	.....	.....
1868	.....	.....	.....	.....	.....	1.04	3.72	5.23	0.20	0.27	.....	.....	.....
1869	.....	.....	.....	.....	3.76	.....	0.30	.....	0.00	0.00	0.20	.....	.....
1870	0.20	0.00	0.10	0.10	0.00	1.60	4.80	1.75	1.70	0.10	0.00	0.03	10.38
1871	0.50	0.00	0.02*	0.16	0.20	1.02	2.49	5.31	2.77	0.38	0.22	0.05	13.12
1872	0.50	0.54	0.56	0.76	3.46	4.05	5.56	4.94	0.04*	0.00	0.24	0.00	20.65
1873	0.30*	0.30	0.04	0.04	0.02*	3.38	3.30	7.38	0.84	0.02	0.00	0.22	15.84
1874	0.54	1.26	0.32	0.94	4.38	1.10	1.24	1.68	3.04	1.24	0.86	1.08	17.68
1875	0.20	0.30	2.52	0.20	5.96	1.50	6.70	5.16	4.76	0.00	0.84	0.00	28.14
1876	0.20	0.00	0.08	0.30	0.80	2.24	4.44	4.36	3.08	0.61*	0.60*	0.32*	17.03
1877	0.12	2.70	0.36	2.08	1.50	0.24	4.50	4.90	4.82	1.01*	0.20	0.60	23.03
1878	0.12	T.*	1.16	0.15*	0.42	2.46	2.46*	3.88	0.18	0.00	3.90	0.30	15.03
1879	0.40	0.30	0.00	1.70*	0.06	0.30	2.46	0.48	0.36	1.24	T.	0.12	7.42
1880	0.14*	0.44*	0.08	T.	1.28	0.25	7.98	6.56	0.84	0.89	0.64	0.48	19.58
1881	1.29	0.18	0.30	2.03	1.51	0.30	4.74	4.59	2.50	3.94	0.56	0.10	22.04
1882	0.32	0.08*	0.29*	0.88	1.20	2.24	2.60	3.30	T.	0.00	0.63*	0.16	11.70
1883	0.14	0.74*	0.22*	0.22	0.10	0.28	2.80	4.81	2.96	1.94	0.00	1.12	15.33
1884	0.18	0.54	0.28	0.28	4.93	3.06	0.76	7.80	1.08	0.73*	T.	1.44*	21.08
1885	0.24	0.30	0.42	0.72	2.15	3.54	2.51	4.76	1.24	0.58	0.18	1.42	18.06
1886	0.98	0.00	0.50	3.22	0.18	1.66	1.18	8.04	3.94	0.96	0.35	0.45	21.46
1887	0.45	0.34*	0.31*	1.91	2.72	4.23	2.83	1.82	0.90	1.70	0.40	0.32*	17.93
Mean..	0.46	0.42	0.46	0.71	1.40	2.12	4.19	4.78	2.06	0.85	0.75	0.45	18.29

*Interpolated. T Indicates trace of rainfall.

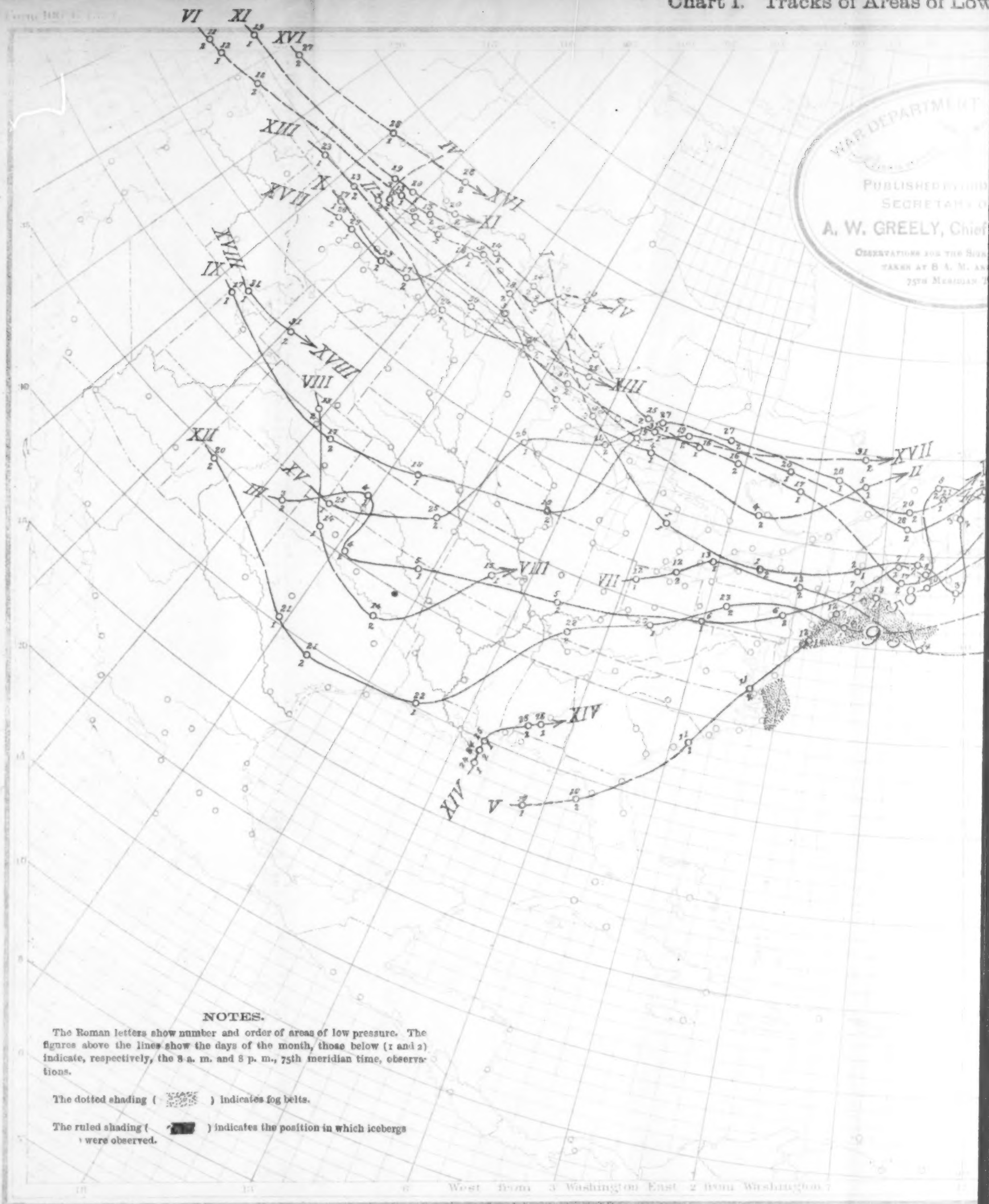
Table of miscellaneous meteorological data for October, 1888—Signal Service observations.

Stations and districts.	Elevation above sea-level, feet.	Atmospheric pressure, in inches and hundredths.								Temperature of the air, in degrees Fahrenheit.														Mean relative humidity, per cent.	Mean temperature of dew-point, degrees Fahrenheit.	Precipitation, in inches.		Winds.						
		Mean actual barometer.	Departure from normal.	Mean reduced barometer.	Extremes.				Monthly range of barometer.	Monthly mean. (8 a.m. and 8 p.m.)	Departure from normal.*	Extremes.						Monthly range.	Daily ranges.								Total movement, miles.	Prevailing direction.	Maximum velocity.			No. of rainy days.	No. of cloudy days.	No. of fair days.	No. of clear days.
					Highest barometer.	Date.	Lowest barometer.	Date.				Max.	Date.	Mean max.	Min.	Date.	Mean min.		Greatest.	Date.	Least.	Date.			Departure from normal precipitation, in inches.				Miles p. h.	Direction.	Date.				
New England.										46.6	— 4.8																					
Eastport	53	29.80	—.15	29.86	30.51	26	29.08	8	1.43	43.4	— 3.3	62.3	7	49.0	31.0	15	38.4	31.3	16.3	15	3.5	13	80.4	37.3	7.95	+ 3.44	7,562	nw.	34	e.	13	15	17	8	6
Portland	99	29.78	—.15	29.89	30.50	26	29.26	8	1.24	43.3	— 5.6	61.0	5	49.9	28.8	23	36.8	32.2	28.0	5	3.9	6	82.4	38.0	7.47	+ 3.75	6,078	nw.	29	nw.	28	15	19	5	7
Manchester	247	29.67	.....	29.93	30.52	26	29.34	8	1.18	42.7	.....	66.7	5	51.3	26.4	1	36.8	40.3	25.1	31	3.3	6	76.7	35.4	5.47	.....	4,651	nw.	30	nw.	8	17	14	12	5
Northfield	871	28.98	.....	29.94	30.48	26	29.44	2	1.04	38.0	.....	61.5	31	46.1	22.5	23	32.0	39.0	37.5	31	2.5	29	86.8	34.1	3.53	.....	6,497	s.	42	n.	24	17	25	3	3
Boston	125	29.80	—.13	29.94	30.52	26	29.34	8	1.18	47.1	— 4.3	69.0	5	54.3	33.8	22	41.1	35.2	23.5	31	2.5	14	71.6	37.8	3.58	— 0.54	8,301	nw.	37	w.	29	13	15	9	7
Nantucket	14	29.92	.....	29.93	30.46	26	29.34	8	1.12	48.8	.....	64.0	5	55.3	35.0	22	43.6	29.0	21.0	22	5.0	3	85.5	44.6	4.99	.....	8,615	nw.	33	nw.	24	13	13	6	12
Wood's Holl	22	29.92	.....	29.94	30.46	26	29.37	8	1.09	48.6	.....	62.8	6	54.3	34.2	22	44.0	28.6	20.2	1	4.5	24	78.5	41.8	3.61	+ 0.41	13,001	nw.	48	w.	29	10	13	9	9
Vineyard Haven	.....	.....	.....	.....	.....	.....	.....	.....	.....	50.4	.....	69.0	7	57.8	33.0	22	43.1	36.0	25.0	5	7.0	2	.....	.....	5.40	.....	.....	nw.	.....	.....	.....	12	.....	.....	.....
Block Island	26	29.92	—.12	29.95	30.46	26	29.41	8	1.05	49.7	— 5.3	62.3	7	54.7	34.1	22	44.7	28.2	17.6	19	3.5	2	79.8	43.6	2.37	— 2.36	13,104	nw.	52	e.	12	14	12	6	13
Narragansett Pier	22	.....	.....	.....	.....	.....	.....	.....	.....	47.8	.....	65.0	7	55.9	28.0	22	39.7	37.0	24.0	4	6.0	24	.....	.....	2.98	— 1.60	.....	nw.	.....	.....	.....	16	.....	.....	.....
New Haven	107	29.84	—.12	29.96	30.46	26	29.47	2	0.99	46.4	— 5.4	66.2	5	55.2	29.6	31	40.1	36.6	25.9	31	1.6	14	81.5	40.7	6.46	+ 2.76	5,366	nw.	28	nw.	24	15	13	10	8
New London	47	28.89	—.14	29.94	30.45	26	29.41	8	1.04	49.4	— 4.7	65.2	2	56.2	32.0	22	42.4	33.2	26.0	1	5.5	14	75.7	41.7	3.77	— 0.58	5,622	nw.	36	ne.	12	14	9	15	7
Mid. Atlantic States.										50.6	— 6.1														3.78	+ 0.56								
Albany	85	29.86	—.12	29.96	30.45	26	29.45	1	1.00	44.5	— 6.4	65.0	5	52.9	30.5	11	38.4	34.5	26.0	31	5.0	21	80.8	38.8	6.10	+ 2.95	3,688	nw.	34	w.	24	16	16	13	2
New York City	185	29.78	—.12	29.98	30.43	26	29.49	1	0.94	49.2	— 5.8	68.7	5	58.5	34.9	22	43.9	33.8	24.5	31	5.1	14	72.4	40.3	4.14	+ 0.84	8,127	w.	50	w.	24	15	11	18	2
Philadelphia	117	29.88	—.10	30.00	30.41	31	29.49	1	0.92	50.4	— 6.4	69.5	5	58.9	34.8	22	44.4	34.7	24.8	31	8.4	24	71.8	41.0	3.23	+ 0.48	7,778	nw.	44	ne.	12	16	12	10	9
Atlantic City	34	29.96	—.10	29.99	30.42	31	29.53	1	0.89	51.4	— 6.8	71.0	2	59.1	30.0	22	43.4	41.0	24.2	3	7.5	6	78.0	44.6	3.48	+ 0.24	8,138	w.	36	w.	24	11	9	11	11
Baltimore	45	29.96	—.10	30.00	30.40	31	29.51	1	0.89	51.4	— 6.3	73.8	19	60.2	36.0	22	45.2	37.8	25.4	16	4.5	26	68.8	41.0	2.99	+ 0.14	4,626	nw.	30	sw.	1	15	12	11	8
Washington City	103	29.91	—.09	30.03	30.42	30	29.55	1	0.87	50.5	— 5.4	75.0	19	60.9	35.2	22	44.3	39.8	27.8	31	5.0	26	76.8	43.1	3.27	+ 0.19	3,823	nw.	24	nw.	24	10	13	7	11
Cape Henry	.....	.....	.....	.....	.....	.....	.....	.....	.....	57.8	.....	70.4	6	65.2	43.0	22	50.5	33.4	24.0	1	4.0	26	.....	.....	2.48	— 1.29	.....	nw.	.....	.....	.....	13	.....	.....	.....
Lynchburgh	658	29.34	—.08	30.05	30.45	31	29.64	2	0.81	50.8	— 6.0	78.0	19	65.6	32.7	10	42.3	45.3	35.3	17	6.3	26	73.4	41.8	4.41	+ 1.30	2,941	s.	22	nw.	8	12	6	16	9
Norfolk	69	29.97	— .11	30.04	30.45	31	29.48	11	0.97	55.8	— 5.9	75.8	6	65.1	40.8	22	49.1	35.0	26.2	1	5.8	26	79.0	49.2	3.94	+ 0.23	6,391	se.	36	s.	1	16	9	10	12
Harrisburg	361	29.61	.....	30.00	30.39	31	29.44	1	0.95	47.6	.....	69.0	1	55.5	34.9	31	42.2	34.1	27.2	5	6.4	24	75.6	39.7	2.04	.....	5,534	nw.	32	nw.	24	16	16	7	8
S. Atlantic States.										61.6	— 3.5														5.77	+ 1.31								
Charlotte	808	29.20	—.04	30.07	30.42	31	29.51	11	0.91	54.3	— 4.7	78.0	17	67.5	37.0	21	47.1	41.0	36.5	1	5.3	26	82.1	48.6	5.87	+ 2.11	3,171	sw.	26	n.	11	11	10	4	17
Hatteras	11	30.06	—.02	30.08	30.45	31	29.65	11	0.80	60.8	— 5.8	76.0	11	66.4	48.2	22	56.1	27.8	23.0	11	4.6	7	79.3	54.2	3.99	— 2.86	9,570	n.	40	nw.	20	8	6	8	17
Kitty Hawk	.....	.....	.....	.....	.....	.....	.....	.....	.....	60.2	.....	78.6	2	68.9	42.9	21	51.4	35.7	26.6	1	6.3	26	.....	.....	5.42	+ 1.33	.....	nw.	.....	.....	.....	11	.....	.....	.....
Raleigh	375	29.63	.....	30.05	30.42	31	29.60	11	0.82	55.2	.....	77.0	19	65.6	33.3	22	46.1	43.7	33.5	23	8.0	27	73.9	46.6	4.31	.....	3,830	sw.	30	ne.	11	10	12	4	15
Southport	.....	.....	.....	.....	.....	.....	.....	.....	.....	62.9	.....	77.4	6	71.0	42.0	15	54.8	35.4	27.0	21	4.0	27	.....	.....	6.98	+ 2.00	.....	sw.	.....	.....	.....	7	.....	.....	.....
Wilmington	52	29.99	—.06	30.05	30.38	31	29.45	11	0.93	59.7	— 3.4	79.2	6	70.8	44.7	15	54.3	34.5	25.7	19	6.8	25	81.6	53.9	5.65	+ 1.62	4,747	ne.	60	ne.	11	13	11	7	13
Charleston	52	30.01	—.04	30.06	30.32	31	29.37	11	0.95	64.2	— 2.0	81.1	17	73.2	50.2	21	58.7	30.9	30.6	17	5.2	25	80.0	57.6	4.83	+ 0.30	6,023	sw.	48	ne.	11	13	9	7	15
Columbia	.....	.....	.....	.....	.....	.....	.....	.....	.....	59.0	.....	82.5	6	70.8	42.5	21	51.5	40.0	29.5	1	7.0	26	79.4	52.1	4.29	.....	.....	.....	.....	.....	.....	10	8	8	15
Augusta	183	29.89	—.04	30.08	30.37	31	29.57	11	0.80	58.0	— 3.8	83.6	19	73.0	41.6	4	51.4	42.0	32.2	1	3.9	26	84.0	52.9	6.37	+ 3.98	2,671	w.	36	n.	11	11	11	5	15
Savannah	87	29.97	—.04	30.06	30.31	31	29.50	11	0.81	63.5	— 2.4	82.3	26	74.2	49.0	1	57.0	33.3	26.0	19	7.9	27	80.0	56.9	6.81	+ 3.02	4,654	w.	50	ne.	11	8	9	5	15
Jacksonville	43	30.01	—.02	30.06	30.27	18	29.64	10	0.63	67.5	— 2.1	86.0	23	78.9	49.9	1	60.9	30.1	35.1	1	7.0	10	83.0	62.0	6.00	+ 0.27	3,957	ne.	38	n.	11	10	4	13	14
Florida Peninsula.										74.6	— 1.0														2.92	— 1.44								
Titusville	12	30.04	.....	30.05	30.26	18	29.65	10	0.61	72.5	.....	87.5	28	80.4	53.0	13	65.0	34.5	24.4	20	6.0	29	83.8	67.2	3.75	.....	5,765	se.	28	s.	10	8	7	6	18
Cedar Keys	22	30.02	—.01	30.04	30.26	18	29.46	10	0.80	70.0	— 1.4	82.6	21	77.3	56.0	15	65.8	26.1	21.1	30	4.1	27	80.8	63.4	2.43	— 0.58	6,069	ne.	75	s.	10	8	9	1	21
Key West	22	30.00	+.03	30.02	30.17	18	29.75	10	0.42	79.1	— 0.6	85.4	8	82.4	65.6	10	74.5	19.8	18.8	10	4.5	7	80.9	72.6	3.42	— 2.30	6,981	e.	36	sw.	11	12	10	7	14
Jupiter	28	30.00	.....	30.03	30.19	18	29.72	10	0.47	76.5	.....	86.1	26	82.4	61.2	13	71.1	24.9	20.2	9	5.4	31	80.2	69.7	3.78	.....	6,422	se.	26	se.	10	6	5	9	17
Micco	.....	.....	.....	.....	.....	.....	.....	.....	.....	73.9	.....	89.0	28	82.0	53.0	13	65.8	36.0	26.8	13	8.1	5	.....	.....	4.95	.....	.....	e.	.....	.....	.....	10	.....	.....	.....
Eastern Gulf States.										63.4	— 3.0														4.11	+ 1.03								
Atlanta	1,129	28.89	—.06	30.08	30.34	31	29.64	11	0.70	55.8	— 4.8	79.2	19	66.6	40.5	21	49.8	38.7	25.0	29	3.6	25	77.0	48.1	3.99	+ 1.44	6,494	nw.	35	w.	13	10	9	9	13
Pensacola	56	29.98	—.07	30.04	30.26	29	29.74	10	0.54	67.2	— 2.0	83.0	6	76.3	51.4	8	61.8	31.1	26.4	1	4.0	10	80.0	60.7	2.49	— 1.20	6,560	ne.	30	se.	25	7	8	5	18
Mobile	35	30.02	—.03	30.06	30.32	29	29.78	10	0.54	65.2	— 2.5	80.0	6	76.4	48.0	4	58.6	38.0	30.0	4	7.8	22	83.5	59.8	2.48	— 0.91	4,718	n.	24	nw.	7	11	7	15	9
Montgomery	217	29.82	—.05	30.05	30.31	29	29.73	11	0.58	62.3	— 3.9	84.3	6	74.0	43.0	21	54.2	41.3	30.8	4	5.5	11	74.4	53.4	5.39	+ 2.98	3,204	n.	18	w.	12	8	9	7	15
Vicksburg	222	29.81	—.07	30.05	30.33	29	29.82	11	0.51	62.0	— 3.4	85.3	17	73.9	44.0	29	55.4	41.3	29.5	30	2.8	23	78.0	54.4	2.97	— 0.21	3,655	se.	15	e.	4	8	13	12	6
University	.....	.....	.....	.....	.....	.....	.....	.....	.....	60.6	.....	80.8	18	70.0	41.5	21	51.3	39.3	27.6	20	8.0	22	.....	.....	1.60	.....	.....	nw.	.....	.....	.....	12	.....	.....	.....
New Orleans	52	29.97	—.04	30.03	30.29	29	29.79	10	0.50	68.0	— 1.2	87.0	16	78.9	54.7	12	62.7	32.3	23.0	15	5.8	24	79.3	61.0	7.36	+ 4.10	5,349	n.	26	w.	11	7	6	8	17
Auburn	.....	.....	.....	.....	.....	.....	.....	.....	.....	62.2	.....	81.0	6	70.9	43.0	21	53.5	38.0	26.0	15	8.0	25	.....	.....	4.39	.....	.....	nw.	.....	.....	.....	9	.....	.....	.....
Port Eads	.....	30.00	.....	.....	.....	.....	.....	.....	.....	73.5	.....	81.4	6	78.8	58.2	12	68.2	23.2	17.8	12	7.7	8	79.2	65.3	3.93	.....	.....	ne.	.....	.....	.....	10	10	14	6
Western Gulf States.										64.9	— 1.6														4.78	— 0.72								
Shreveport	249	29.78	—.07	30.04	30.33	29	29.82	26	0.51	63.4	— 2.4	87.4	17	75.6	43.5	29	55.7	43.9	34.8	29	3.5	22	77.2	55.4	2.73	— 0.94	4,314	s.	30	nw.	11	8	7	10	14
Fort Smith	470	29.55	—.03	30.05	30.34	29	29.77	26	0.57	56.2	— 4.1	84.5	18	71.4	34.0	24	48.4	50.5	37.6	29	5.5	21	74.0	47.2	3.57	+ 0.06	3,454	se.	18	w.	1	9	6	4	21
Little Rock	309	29.73	—.04	30.06	30.33	29	29.83	26	0.50	57.0	— 6.2	82.5	1	67.8	37.0	24	49.7	45.5	32.6	29	3.4	6	77.1	49.2	2.39	— 0.25	3,469	nw.	24	nw.	15	12	11	6	14
Corpus Christi	20	29.99	—.06	30.01	30.24	29	29.82	21	0.42	72.6	— 1.2	85.3	10	78.5	50.0	23	67.2	35.3	31.8	10	4.0	23	84.8	67.6	2.91	.....	7,908	se.	36	ne.	2	4	3	15	13
Galveston	44	29.98	—.05	30.02	30.26	29	29.84	21	0.42	72.2	+ 0.1	85.0	6	77.4	53.8	24	68.8	31.2	15.2	11	4.4	22	79.0	65.0	5.67	+ 0.44	8,248	s.	40	ne.	23	8	7	11	13
Palestine	511	29.51	—.03	30.06	30.33	29	29.85	26	0.48	65.4	+ 1.0	90.2	17	79.8	30.7	24	56.2	53.5	40.1	29	8.1	22	82.4	59.6	1.51	— 2.24	4,147	s.	22	s.	15	6	7	8	10
San Antonio	781	29.22	—.03	30.03	30.29	29	29.86	25	0.43	67.2	+ 1.4	87.6	17	80.6	40.0	25	60.2	47.6	37.6	25	6.8	8	77.2	59.0	0.82	— 1.42	5,503	se.	25	s.	21	8	12	10	9
Rio Grande Valley.										72.5	+ 0.8														1.81	— 2.06								
Rio Grande City	230	29.81	—.05	30.05	30.30	29	29.85	21	0.45	72.1	+ 1.3	93.8	21	86.0	52.6	25	66.6	41.2	28.4	25	2.2	23	86.2	67.0	1.57	— 0.55	3,787	se.	23	se.	18	8	16	6	9
Brownsville	57	29.94	—.04	30.00	30.22	29	29.84	21	0.38	72.9	+ 0.4	88.0	5	83.9	52.0	24	69.0	36.0	29.2	25	8.4	23	88.6	69.4	2.05	— 3.56	5,657	s.	26	s.	21	10	5	7	19
Ohio Val. & Tenn.										51.8	— 5.6														3.86	+ 0.89								
Chattanooga	783	29.24	—.07	30.07	30.36	31	29.71	11	0.65	55.2	— 4.7	82.2	19	67.5	36.6	21	47.1	45.6	34.3	18	6.8	12	80.6	48.9	5.17	+ 1.91	3,887	w.	23	sw.	19	13	9	9	13
Knoxville	980	29.03	—.08	30.08	30.37	31	29.73	11	0.64	52.1	— 6.3	78.1	19	63.7	35.6	21	45.7	42.5	33.7	18	3.8	12	78.4	45.0	6.11	+ 3.02	4,060	w.	30	sw.	1	16	10	8	13
Memphis	320	29.71	—.06	30.05	30.33	29	29.81	11	0.52	56.9	— 5.0	82.6	18	67.6	40.0	21	50.5	42.6	30.5	29	3.2	23	77.1	49.2	3.51	+ 0.18	3,942	n.	24	sw.	1	10	14	3	14
Nashville	549	29.46	—.06	30.04	30.32	29	29.74	11	0.58	53.9	— 5.6	80.7	18	65.5	36.0	21	47.3	44.7	35.5	18	3.9	12	77.9	46.3	2.82	+ 0.02	4,329	nw.	24	se.	15	14	11	9	11
Louisville	551	29.44	—.06	30.03	30.36	21	29.60	1	0.76	52.5	— 6.0	77.4	1	63.4	32.5	21	44.5	44.9	33.3	29	8.1	6	72.6	43.5	2.84	— 0.31	5,304	w.	24	w.	1	14	16	5	10
Indianapolis	766	29.19	—.08	30.01	30.37	21	29.59	1	0.78	48.5	— 4.5	78.4	1	58.5	32.0	3	42.5	46.4	28.3	7	3.5	23	71.6	38.8	4.03	+ 0.95	3,115	se.	22	w.	28	14	15	6	10
Terre Haute	.....	.....	.....	.....	.....	.....	.....	.....	.....	52.4	.....	79.5	1	62.8	28.8	21	42.1	50.7	33.9	1	6.8	23	.....	.....	2.22	.....	.....	w.	.....	.....	.....	14	.....	.....	.....
Cincinnati	628	29.34	—.09	30.02	30.35	21	29.57	1	0.78	50.5	— 6.0	79.2	1	60.3	33.9	21	43.6	45.3	33.8	31	6.6	20	73.9	41.9	3.05	+ 0.38	5,263	se.	35	sw.	1	15	16	6	9
Columbus	812	29.14	—.09	30.02	30.38	21	29.55	1	0.83	47.4	— 6.3	76.1	1	56.3	31.3	3	41.1	44.8	29.9	31	5.5	2	75.3	39.4	3.77	+ 0.85	5,914	nw.	46	sw.	1	14	14	9	8
Pittsburgh	847	29.09	—.10	29.98	30.35	21	29.48	1	0.87	49.0	— 6.2	73.8	1	57.1	32.7	10	42.5	41.1	29.4	31	5.3	21	72.8	40.2	3.46	+ 1.02	4,663	nw.	29	nw.	16	18	20	7	4
Parkersburgh	638	29.34	.....	30.04	30.37	21	29.53	1	0.84	47.6	.....	74.3	1	57.6	28.3	10	40.5	46.0	30.1	31	4.2	20	78.8	40.8	4.95	.....	3,964	se.	36	sw.	1	16	13	6	12
Lexington	.....	28.92	.....	.....	.....	.....	.....	.....	.....	50.4	.....	74.0	1	59.4	32.0	21	42.7	42.0	31.0	29	6.2	2	74.9	42.0	3.02	.....	7,991	se.	48	s.	1	15	16	8	7
Lower lakes region.										48.7	— 6.1														2.95	— 0.23								
Buffalo	690	29.22	—.08	29.97	30.38	22	29.38	1	1.00	45.0	— 5.9	66.2	31	50.9	30.8	22	39.3	35.4	27.2	31	3.1	6	76.0	37.4	5.43	+ 1.61	8,642	w.	41	sw.	16	20	22	7	2
Oswego	335	29.58	—.11	29.95	30.35	22	29.36	1	0.99	44.0	— 5.9	70.5	31	50.2	29.7	11	38.0	40.8	37.0	31	4.3	18	75.0	36.0	3.24	— 0.08	9,062	nw.	32	n.	8	19	23	6	2
Rochester	621	29.29	—.10	29.96	30.39	22	29.35	1	1.04	43.6	— 6.8	71.6	31	50.7	29.0	22	37.6	42.6	35.6	31	3.7	21	79.6	37.1	3.22	+ 0.17	8,040	w.	36	w.	24	13	10	7	13
Erie	714	29.19	—.14	29.96	30.36	21	29.42	1	0.94	46.6	— 6.6	72.0	31	54.2	33.8	21	40.7	38.2	30.5	31	7.2	6	75.6	32.7	3.17	— 1.18	9,320	nw.	42	se.	26	21	24	2	5
Cleveland	678	29.24	—.09	29.98	30.38	21	29.48	1	0.90	47.8	— 6.0	74.8	31	54.4	31.0	10	41.6	43.8	31.8	31	3.6	21	69.4	37.6	2.90	+ 0.03	7,255	se.	28	nw.	28	12	18	7	6
Sandusky	629	29.30	—.09	29.99	30.36	21	29.48	1	0.88	47.0	— 6.1	76.0	1	54.2	32.7	10	41.6	43.3	31.7	31	3.6	5	73.8	38.6	1.89	— 0.90	7,578	sw.	35	nw.	1	13	17	9	5
Toledo	673	29.26	—.10	29.99	30.38	21	29.48	1	0.90	46.2	— 5.4	76.0	31	55.1	28.8	9	40.1	47.2	34.9	1	4.3	15	73.4	37.6	1.64	— 1.04	7,688	sw.	36	w.	1	13	19	4	8
Detroit	667	29.27	—.07	29.99	30.40	21	29.42	1	0.98	45.2	— 6.2	72.5	31	53.6	30.2	3	40.1	42.3	30.5	31	3.8	12	79.4	35.8	2.09	— 0.47	7,366	sw.	35	w.	16	14	17	5	9
Upper lake region.										43.9	— 3.7														2.20	— 1.28								
Alpena	609	29.28	—.08	29.95	30.40	21	29.36	1	1.04	41.6	— 3.4	66.0	31	48.6	26.0	9	36.3	40.0	23.2	4	3.0	23	84.6	37.2	2.90	— 1.53	7,435	w.	40	e.	19	19	28	2	1
Escanaba	608	.....	.....	.....	.....	.....	.....	.....	.....	44.2	.....	72.0	7	52.0	24.0	9	36.5	48.0	30.0	9	5.5	15	.....	.....	2.01	— 1.77	.....	n.	.....	.....	.....	15	.....	.....	.....
Grand Haven	620	29.29	—.07	29.96	30.38	21	29.40	1	0.98	45.4	— 4.2	64.0	26	52.1	29.5	9	39.4	34.5	25.0	4	5.0	16	77.0	38.1	2.00	— 1.88	9,198	ne.	42	w.	19	13	19	2	10
Lansing	883	29.02	.....	29.98	30.38	21	29.42	1	0.96	43.5	.....	73.0	31	53.4	25.0	30	37.1	48.0	33.3	10	4.7	12	80.6	40.4	2.97	.....	4,893	sw.	28	sw.	19	14	19	8	4

Table of miscellaneous meteorological data for October, 1888—Signal Service observations—Continued.

Stations and districts.	Elevation above sea-level, feet.	Atmospheric pressure, in inches and hundredths.								Temperature of the air, in degrees Fahrenheit.												Mean relative humidity, per cent.	Mean temperature of dew-point, Fahrenheit.	Precipitation, in inches.		Winds.						
		Mean actual barometer.	Departure from normal.	Mean reduced barometer.	Extremes.				Monthly range of barometer.	Monthly mean. (8 a.m. and 8 p.m.)	Departure from normal.*	Extremes.						Monthly range.	Daily ranges.								Total movement, miles.	Prevailing direction.	Maximum velocity.		No. of rainy days.	No. of cloudy days.	No. of fair days.	No. of clear days.
					Highest barometer.	Date.	Lowest barometer.	Date.				Max.	Date.	Mean max.	Min.	Date.	Mean min.		Greatest.	Date.	Least.	Date.							Miles p. h.	Direction.	Date.				
Ex. northwest—Con.																																
Fort Buford	1,900	27.90	—.06	29.94	30.28	12	29.28	24	1.00	41.6	+ 1.8	75.8	3	55.2	21.8	25	32.3	54.0	42.5	7	3.4	4	70.8	31.1	0.62	— 0.37	6,969	nw.	60	nw.	24	9	14	14	3
Fort Totten	1,487	28.32	—.06	29.96	30.33	2	29.41	24	0.92	38.4	— 0.4	78.0	7	51.1	19.0	13	32.1	59.0	38.6	3	3.0	19	77.0	30.8	0.87	— 0.06	10,088	nw.	48	nw.	25	7	13	8	10
Fort Yates	.....	.....	.....	.....	.....	.....	.....	.....	.....	46.5	.....	81.7	8	60.6	21.2	13	32.4	60.5	49.5	7	10.1	19	.....	.....	0.39	— 0.23	.....	nw.	..	.....	..	8	..	..	..
Upper Miss. Valley.										47.9	— 3.7														2.06	— 1.02							
Saint Paul	831	29.04	—.06	29.95	30.29	21	29.52	24	0.77	43.1	— 2.8	75.4	7	53.2	27.7	3	37.2	47.7	36.0	3	5.8	4	81.4	37.3	1.10	— 0.92	5,150	se.	26	w.	15	9	13	14	4
La Crosse	744	29.19	—.03	30.00	30.36	21	29.59	1	0.70	44.6	— 3.4	73.0	7	54.8	25.6	21	38.3	47.4	32.5	7	6.2	19	72.2	35.2	1.12	— 1.34	5,604	s.	30	s.	30	9	11	10	10
Davenport	615	29.32	—.06	29.99	30.36	21	29.57	1	0.79	46.9	— 3.6	74.4	31	58.3	30.0	3	40.5	44.4	30.6	7	3.2	5	74.1	38.1	2.81	— 0.32	5,915	w.	32	sw.	24	10	7	11	13
Des Moines	866	29.07	—.07	30.00	30.29	21	29.63	26	0.66	46.8	— 3.2	79.0	30	59.8	27.8	17	39.9	51.2	40.5	7	3.7	21	69.6	36.0	0.84	— 3.28	5,164	n.	31	s.	24	6	11	6	14
Dubuque	665	29.27	—.06	29.99	30.37	21	29.55	1	0.82	46.2	— 2.5	77.3	7	57.7	28.3	3	39.3	49.0	39.5	7	5.6	23	78.2	39.3	1.62	— 1.52	3,595	nw.	25	w.	19	7	14	5	12
Keokuk	618	29.33	—.07	29.99	30.37	21	29.63	1	0.66	48.6	— 3.6	73.0	31	60.8	32.1	3	41.9	45.9	34.6	30	8.9	20	70.0	38.5	1.63	— 1.77	6,093	nw.	35	sw.	18	9	7	11	13
Cairo	359	29.66	—.06	30.04	30.37	26	29.70	1	0.57	53.6	— 5.2	82.1	1	64.8	36.5	24	46.9	45.6	33.1	29	2.0	23	73.4	44.5	3.24	+ 0.29	5,173	n.	30	sw.	1	14	15	8	8
Springfield, Ill	644	29.34	—.07	30.03	30.36	21	29.67	1	0.69	48.4	— 5.1	76.6	31	60.2	32.1	3	41.6	44.5	32.7	30	6.5	23	75.6	40.6	3.61	— 0.15	6,774	s.	28	w.	19	13	9	12	10
Saint Louis	571	29.41	—.07	30.03	30.34	21	29.71	1	0.63	52.6	— 4.0	85.2	18	64.7	36.0	21	45.3	49.2	42.7	18	5.0	22	70.7	42.6	2.59	— 0.21	8,107	s.	36	s.	15	9	10	7	14
Missouri Valley.										46.2	— 2.3														0.86	— 1.00							
Lamar	1,028	28.97	.....	30.07	30.38	28	29.76	26	0.62	51.4	.....	83.3	1	66.5	31.5	20	43.4	51.8	35.2	7	3.2	21	76.4	43.4	3.63	.....	6,074	s.	36	sw.	18	10	7	4	20
Springfield, Mo	1,356	28.60	—.05	30.05	30.31	28	29.76	26	0.55	51.0	.....	82.0	18	64.3	33.0	20	44.1	49.0	39.2	28	3.0	22	76.2	43.0	5.07	.....	7,399	se.	36	n.	2	9	7	10	14
Leavenworth	842	29.14	—.04	30.03	30.35	20	29.67	25	0.68	51.0	— 2.5	85.8	18	65.0	32.1	30	44.0	53.7	34.8	30	2.8	21	73.0	42.1	2.60	— 0.76	4,765	nw.	36	sw.	18	6	7	8	16
Topeka	.....	.....	.....	.....	.....	.....	.....	.....	.....	49.1	.....	86.2	4	67.7	25.0	28	40.1	61.2	41.4	7	6.2	22	75.0	40.4	2.39	.....	.....	.....	.....	.....	..	4	5	13	13
Omaha	1,113	28.84	—.05	30.03	30.31	20	29.66	25	0.65	48.4	— 2.8	80.2	30	61.9	28.2	20	40.6	52.0	38.0	7	6.9	5	67.6	37.0	1.16	— 1.74	5,110	n.	28	nw.	12	3	13	7	11
Crete	.....	.....	.....	.....	.....	.....	.....	.....	.....	46.8	.....	79.6	8	63.1	24.3	20	37.6	55.3	34.2	5	7	4	70.7	36.8	2.03	.....	.....	.....	.....	.....	..	4	6	6	19
Valentine	2,614	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Fort Sully	1,600	28.27	—.04	29.99	30.30	2	29.41	24	0.89	43.4	.....	79.0	8	59.9	18.2	20	34.3	60.8	47.2	28	8.8	18	58.6	28.2	0.21	— 0.49	6,362	nw.	42	w.	27	3	4	14	13
Huron	1,307	28.58	—.03	30.00	30.31	2	29.47	24	0.84	41.3	— 2.4	78.8	8	57.8	16.8	13	31.3	62.0	52.0	7	6.0	26	64.2	28.3	0.29	— 1.42	7,149	se.	40	nw.	19	6	8	10	13
Yankton	1,234	28.66	—.05	29.98	30.29	20	29.56	24	0.73	44.2	— 1.4	81.8	9	61.8	23.5	28	35.5	58.3	48.0	7	7.8	21	70.8	34.4	0.55	— 1.05	5,122	nw.	32	nw.	19	4	1	10	14
Kansas City	947	29.02	.....	30.05	30.32	20	29.72	25	0.60	52.3	.....	85.0	18	64.2	35.1	20	45.1	49.9	31.2	7	3.4	21	67.8	41.0	4.49	.....	7,261	nw.	42	w.	23	5	14	13	4
Northern slope.										45.8	— 1.5														0.62	— 0.33							
Fort Assiniboine	2,720	27.10	—.07	29.94	30.36	18	29.30	23	0.90	43.1	+ 4.0	79.0	7	58.9	16.2	19	33.2	62.8	46.0	7	9.0	15	60.6	28.6	0.34	— 0.16	7,444	w.	40	sw.	25	10	19	4	8
Fort Custer	3,040	26.81	—.05	29.97	30.38	19	29.43	23	0.95	46.6	+ 1.4	78.0	29	60.9	16.5	19	35.9	61.5	44.9	28	7.0	11	55.8	29.0	0.66	— 0.35	5,268	se.	51	nw.	24	4	14	8	9
Fort Maginnis	4,340	25.51	—.06	29.93	30.30	19	29.35	23	0.75	42.0	+ 1.6	75.0	2	54.3	17.5	19	34.8	57.5	34.6	6	5.8	31	61.6	28.6	0.93	— 0.40	8,608	nw.	54	nw.	24	11	5	14	12
Helena	4,069	25.81	—.05	29.96	30.30	18	29.39	23	0.91	46.6	+ 4.2	75.0	1	57.2	21.0	27	39.2	54.0	32.5	6	6.9	15	47.2	25.8	0.14	— 0.94	5,739	sw.	36	sw.	19	5	12	10	9
Poplar River	2,030	27.81	—.05	29.94	30.34	19	29.31	24	1.03	41.3	+ 1.2	77.0	3	56.9	19.0	31	31.4	58.0	45.9	3	5.7	18	71.2	31.5	0.88	— 0.01	5,327	w.	48	nw.	19	5	9	17	5
Rapid City	3,280	26.58	.....	29.99	30.29	12	29.44	24	0.85	44.4	.....	79.2	8	58.8	21.0	26	36.6	58.2	48.0	28	3.4	5	51.8	26.0	0.43	.....	6,335	w.	40	n.	18	8	6	14	11
Cheyenne	6,105	24.02	—.02	30.02	30.46	19	29.61	26	0.85	43.2	+ 0.8	72.0	13	59.0	16.5	19	32.6	55.5	41.0	19	11.2	5	47.2	21.7	0.30	— 0.39	7,261	nw.	42	w.	23	5	14	13	4
Fort Laramie †	.....	.....	.....	.....	.....	.....	.....	.....	.....	50.6	.....	77.0	3	66.9	27.4	13	34.2	49.6	44.8	3	16.0	12	.....	.....	0.26	.....	.....	w.	.....	.....	..	3	.....	.....	.....
North Platte	2,841	27.06	—.05	30.03	30.36	19	29.67	24	0.69	44.0	— 2.4	80.0	30	63.3	19.8	19	33.8	60.2	46.9	28	6.8	5	64.6	31.6	1.12	— 0.06	5,750	w.	32	nw.	18	4	5	19	7
Fort McKinney	.....	24.96	.....	30.00	30.38	19	29.61	23	0.77	44.0	.....	77.0	1	59.0	19.0	19	35.8	58.0	45.0	28	7.0	24	57.8	28.7	0.05	.....	6,648	w.	48	n.	18	4	13	11	7
Middle slope.										50.6	— 0.5														1.08	— 0.81							
Colorado Springs	.....	.....	.....	.....	.....	.....	.....	.....	.....	46.3	.....	74.8	13	62.0	21.6	27	36.0	53.2	44.2	28	8.5	6	56.4	30.2	0.84	.....	.....	.....	.....	.....	..	2	5	14	12
Denver	5,281	24.77	—.01	30.00	30.36	19	29.61	24	0.75	48.4	+ 1.0	79.8	14	64.5	26.0	19	37.4	53.8	46.0	28	9.8	25	51.2	29.3	0.77	+ 0.04	4,678	s.	36	nw.	26	4	4	20	7
Pueblo	4,724	25.27	.....	30.02	30.30	19	29.66	24	0.64	50.6	.....	84.0	13	66.0	25.0	28	39.2	59.0	50.0	13	5.6	6	45.2	26.2	0.48	.....	4,369	nw.	38	nw.	24	3	11	10	11
Concordia	1,384	28.53	.....	30.00	30.30	20	29.60	25	0.70	49.4	— 1.8	81.8	30	66.5	21.6	20	39.9	60.2	41.2	28	8.7	14	64.4	36.4	1.43	— 0.12	2,895	s.	27	s.	24	4	6	6	19
Dodge City	2,524	27.39	—.04	30.04	30.39	19	29.66	25	0.73	50.8	— 0.9	84.8	1	69.1	30.4	23	41.1	54.4	43.3	29	7.3	21	60.6	35.9	0.81	— 0.39	7,102	s.	54	s.	31	4	3	10	18
Fort Reno	.....	.....	.....	.....	.....	.....	.....	.....	.....	50.3	.....	86.2	17	74.1	33.6	23	46.5	52.6	.....	.....	.....	.....	.....	.....	1.49	— 2.24	.....	.....	.....	.....	..	4	.....	.....	.....
Fort Supply	.....	.....	.....	.....	.....	.....	.....	.....	.....	52.3	.....	88.4	1	72.3	34.6	28	44.5	53.8	37.2	25	13.5	18	.....	.....	1.15	— 0.19	.....	s.	.....	.....	..	6	.....	.....	.....
Fort Elliott	2,650	27.25	—.04	29.97	30.28	28	29.61	25	0.67	54.0	— 0.2	87.7	18	70.8	34.2	22	44.8	53.5	37.0	16	5.9	21	66.5	41.8	0.85	— 1.97	8,135	s.	44	nw.	14	3	6	4	21
Wichita	1,354	28.56	.....	30.00	30.28	28	29.63	25	0.65	53.4	.....	85.6	1	68.8	32.0	20	44.3	53.6	37.2	18	5.2	22	64.9	40.4	1.30	.....	6,766	s.	36	s.	30	7	4	13	14
Southern slope.										55.7	— 0.6														2.11	— 0.33							
Fort Sill	1,200	28.80	—.01	30.03	30.33	28	29.69	25	0.64	55.9	— 2.7	87.5	17	72.4	33.0	23	46.2	54.5	38.9	29	7.0	9	76.5	48.0	2.36	— 0.87	7,339	n.	36	sw.	14	6	12	3	16
Abilene	1,748	28.20	—.06	30.01	30.29	28	29.72	25	0.57	61.9	+ 0.8	91.8	14	75.8	39.5	23	53.8	52.3	32.3	28	4.5	22	76.0	53.7	2.00	— 1.21	7,439	sw.	30	s.	17	4	8	4	19
Fort Davis	4,928	25.20	—.07	30.01	30.27	29	29.80	25	0.47	58.4	+ 0.4	85.0	13	73.2	30.0	24	49.7	49.0	35.0	15	8.0	22	60.5	41.5	1.93	+ 0.10	4,259	sw.	24	ne.	19	9	7	8	10
Fort Stanton	6,154	23.98	.....	29.90	30.17	29	29.70	25	0.47	49.4	.....	77.5	13	65.5	28.8	23	38.2	48.7	43.5	15	5.7	6	47.1	28.4	2.14	+ 0.66	4,618	w.	28	w.	15	4	7	3	21
Southern plateau.										60.9	+ 1.9														1.76	+ 0.77							
El Paso	3,796	26.19	—.06	29.93	30.18	29	29.74	3	0.44	62.8	— 1.3	90.8	13	79.2	38.0	24	52.2	52.8	42.0	12	5.4	22	53.6	41.7	1.13	— 0.18	5,247	e.	39	ne.	20	4	4	8	19
Lava	.....	.....	.....	.....	.....	.....	.....	.....	.....	57.0	.....	86.0	10	72.7	27.8	23	41.5	58.2	45.0	16	7.1	22	.....	.....	3.10	— 0.15	.....	sw.	.....	.....	..	6	.....	.....	.....
Santa Fé	7,026	23.29	—.05	30.01	30.28	29	29.75	25	0.53	48.4	+ 1.0	72.3	13	62.1	29.5	22	39.9	42.8	31.5	15	2.0	21	49.8	26.4	1.40	+ 0.34	4,547	n.	28	w.	18	5	6	5	20
Fort Apache	5,020	.....	.....	.....	.....	.....	.....	.....	.....	58.8	.....	86.7	12	75.3	30.2	23	42.2	56.5	43.7	12	12.1	21	.....	.....	1.23	— 0.31	.....	sw.	.....	.....	..	6	.....	.....	.....
Fort Bowie	.....	.....	.....	.....	.....	.....	.....	.....	.....	63.7	.....	84.0	12	72.4	41.5	22	54.6	42.5	.....	.....	.....	.....	.....	.....	1.89	+ 0.86	.....	sw.	.....	.....	..	4	.....	.....	.....
Fort Grant	4,860	25.22	—.03	29.98	30.18	23	29.80	3	0.38	63.0	+ 2.6	87.0	11	75.1	38.0	24	54.1	49.0	28.8	24	10.4	6	42.4	37.3	1.19	+ 0.35	3,376	nw.	30	s.	19	3	4	5	22
Fort McDowell	.....	.....	.....	.....	.....	.....	.....	.....	.....	69.9	.....	100.0	11	86.4	45.8	23	53.4	55.0	44.0	9	15.0	18	.....	.....	2.82	+ 2.19	.....	w.	.....	.....	..	7	.....	.....	.....
Fort Thomas	3,710	.....	.....	.....	.....	.....	.....	.....	.....	64.8	.....	92.0	12	81.6	41.0	23	48.1	51.0	43.0	11	14.0	21	.....	.....	2.80	.....	.....	w.	.....	.....	..	6	.....	.....	.....
Fort Verde	.....	.....	.....	.....	.....	.....	.....	.....	.....	64.0	.....	95.4	12	81.9	35.0	23	44.7	60.4	51.3	10	20.0	20	.....	.....	4.47	+ 3.99	.....	w.	.....	.....	..	6	.....	.....	.....
Prescott	5,389	24.73	—.03	29.98	30.23	23	29.78	18	0.45	53.0	+ 2.9	84.5	11	70.8	29.0	23	41.0	55.5	42.7	10	6.3	18	49.8	30.7	1.75	+ 1.24	5,588	sw.	39	s.	17	5	8	6	17
San Carlos	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	42.0	22	51.1	.....	.....	.....	.....	.....	.....	.....	7.73	+ 1.10	.....	sw.	.....	.....	..	3	.....	.....	.....
Willcox	.....	.....	.....	.....	.....	.....	.....	.....	.....	61.6	.....	93.8	9	82.1	30.9	24	41.2	62.9	57.8	9	18.3	20	.....	.....	1.15	+ 0.05	.....	w.	.....	.....	..	6	.....	.....	.....
Yuma	141	29.67	—.09	29.81	30.06	23	29.61	17	0.45	73.9	+ 2.9	105.1	11	90.5	49.0	22	59.3	56.1	45.1	11	15.4	19	56.3	54.2	0.99	+ 0.87	3,454	e.	30	s.	18	3	2	4	25
Keeler	3,622	26.28	.....	29.88	30.12	22	29.57	17	0.55	64.4	+ 3.2	85.1	11	76.5	47.0	20	53.9	38.1	28.2	8	9.8	17	34.0	33.3	0.00	— 0.37	4,256	n.	36	nw.	21	0	2	3	20
Middle plateau.										61.0	+ 1.9														0.69	— 0.39							
Fort Bidwell	4,640	25.43	.....	30.08	30.44	22	29.77	16	0.67	50.4	+ 2.9	79.0	5	67.5	22.0	22	36.4	57.0	43.0	19	12.2	30	63.0	37.9	0.20	— 0.51	3,901	w.	28	w.	24	1	8	12	11
Winnemucca	4,344	25.67	+.01	30.04	30.41	22	29.75	16	0.66	51.2	+ 1.6	79.5	12	66.3	20.8	22	34.9	58.7	51.3	15	8.3	24	36.2	20.4	0.06	— 0.54	6,066	w.	36	w.	12	2	10	7	14
Fort 1½ Chesne	.....	25.04	.....	30.00	30.34	26	29.67	24	0.67	43.5	.....	80.2	1	65.7	17.0	27	31.9	63.2	44.6	16	14.6	2	49.0	24.4	0.15	.....	3,517	s.	38	w.	26	3	5	13	13
Salt Lake City	4,348	25.63	—.05	29.98	30.25	14	29.66	17	0.59	54.0	+ 3.0	78.2	12	64.4	31.5	22	43.7	46.7	33.0	29	7.0	3	44.9	31.2	0.80	— 0.82	3,604	nw.	25	s.	17	7	7	5	19
Montrose	5,795	24.30	.....	29.98	30.29	28	29.68	25	0.61	48.6	0.0	78.0	13	63.0	25.3	23	36.9	52.7	41.7	16	11.9	2	61.1	34.5	1.00	+ 0.76	3,301	se.	23	se.	2	11	7	7	13
Carson City	.....	.....	.....	.....	.....	.....	.....	.....	.....	51.2	.....	79.7	11	67.9	22.3	22	36.8	57.4	45.7	15	9.2	31	53.4	32.4	T.	.....	.....	.....	.....	.....	..	0	3	5	23
Brock's	.....	.....	.....	.....	.....	.....	.....	.....	.....	51.2	.....	82.1	1	65.7	26.6	28	36.7	55.5	38.1	14	13.6	26	.....	.....	0.54	.....	.....	.....	.....	.....	..	5	.....	.....	.....
Northern plateau.										50.3	+ 3.2														0.92	— 0.39							
Boise City	2,750	27.18	—.05	30.02	30.36	22	29.63	23	0.73	52.6	+ 3.2	82.0	5	66.9	24.8	20	39.4	57.2	41.6	15	7.5	30	51.1	32.8	0.78	— 0.53	2,092	w.	22	se.	24	6	15	5	11
Ashland	.....	.....	.....	.....	.....	.....	.....	.....	.....	57.0	.....	84.5	5	70.8	31.0	21	43.2	53.5	41.0	15	12.5	29	.....	.....	0.88	— 0.46	.....	w.	.....	.....	..	8	.....	.....	.....
Fort Klamath	.....	.....	.....	.....	.....	.....	.....	.....	.....	45.6	.....	78.0	5	63.5	14.0	17	27.8	64.0	48.3	18	10.7	8	.....	.....	0.29	— 0.57	.....	w.	.....	.....	..	4	.....	.....	.....
Lakeview	.....	.....	.....	.....	.....	.....	.....	.....	.....	52.1	.....	83.0	5	67.5	25.5	21	36.7	57.5	44.0	14	11.0	30	.....	.....	0.28	— 0.59	.....	s.	.....	.....	..	6	.....	.....	.....
Linkville	.....	.....	.....	.....	.....	.....	.....	.....	.....	49.6	.....	78.1	5	63.4	25.0	13	35.9	53.1	42.9	15	13.0	25	.....	.....	0.33	— 0.69	.....	n.	.....	.....	..	7	.....	.....	.....
Spokane Falls	1,909	27.98	—.03	30.02	30.38	18	29.46	23	0.92	48.0	+ 3.4	81.5	5	60.8	23.0	18	38.0	58.5	40.5	6	11.2	24	68.8	36.8	1.57	— 0.50	3,053	sw.	30	sw.	23	13	15	3	3
Walla Walla	1,018	28.93	—.07	30.02	30.39	21	29.64	25	0.75	56.2	.....	81.4	4	65.6	33.0	19	48.0	48.4	27.7	5	9.0	30	60.2	41.2	2.33	+ 0.89	4,530	sw.	40	sw.	23	10	10	7	8
N. Pac. coast region.										53.6	+ 3.2														6.53	+ 1.71							
Fort Canby	179	29.83	—.02	30.02	30.40	21	29.73	25	0.67	53.2	+ 1.2	66.8	4	58.7	41.3	31	50.9	35.5	14.5	18	4.2	7	89.5	53.0	6.89	+ 2.22	7,827	s.	54	se.	27	22	20	9	2
Olympia	36	29.99	—.03	30.03	30.40	21	29.66	25	0.74	53.2	+ 3.8	74.0	5	60.4	35.0	18	47.1	39.0	29.0	5	5.5	11	87.0	49.0	4.27	— 0.46	2,807	s.	17	w.	23	19	19	9	3
Port Angeles	14	29.97	—.07	29.98	30.36	21	29.56	25	0.80	49.0	+ 3.2	62.2	1	55.2	30.6	30	43.3	31.6	18.3	30	4.8	10	88.8	45.6	4.31	+ 1.45	2,655	s.	23	w.	23	19	24	4	3
Pysht	.....	.....	.....	.....	.....	.....	.....	.....	.....	49.5	.....	63.0	2	54.5	36.0	24	44.5	27.0	.....	.....	.....	.....	.....	.....	9.44	+ 3.01	.....	sw.	.....	.....	..	26	.....	.....	.....
Tatoosh Island	86	29.88	—.06	29.97	30.37	21	29.57	25	0.80	52.2	+ 1.7	63.0	6	56.5	42.0	31	48.9	21.0	11.8	9	3.4	29	92.6	50.0	12.12	+ 4.62	10,323	e.	56	e.	12	26	24	3	4
Astoria	38	.....	.....	.....	.....	.....	.....	.....	.....	55.7	.....	68.0	6	60.4	41.0	31	51.1	27.0	.....	.....	.....	.....	.....	.....	7.45	+ 2.67	.....	sw.	.....	.....	..	25	.....	.....	.....
Portland	80	29.96	—.03	30.06	30.43	21	29.72	5	0.71	55.4	+ 3.3	81.5	5	63.7	37.0	31	48.9	44.5	33.5	5	7.1	2	85.2	50.6	4.97	+ 0.64	3,191	s.	27	s.	25	19	21	7	3
Roseburgh	523	29.52	—.03	30.08	30.47	22	29

Chart I. Tracks of Areas of Low



WAR DEPARTMENT
PUBLISHED BY THE
SECRETARY OF
A. W. GREELY, Chief
OBSERVATIONS FOR THE SIGN
TAKEN AT 8 A. M. AN
75TH MERIDIAN T

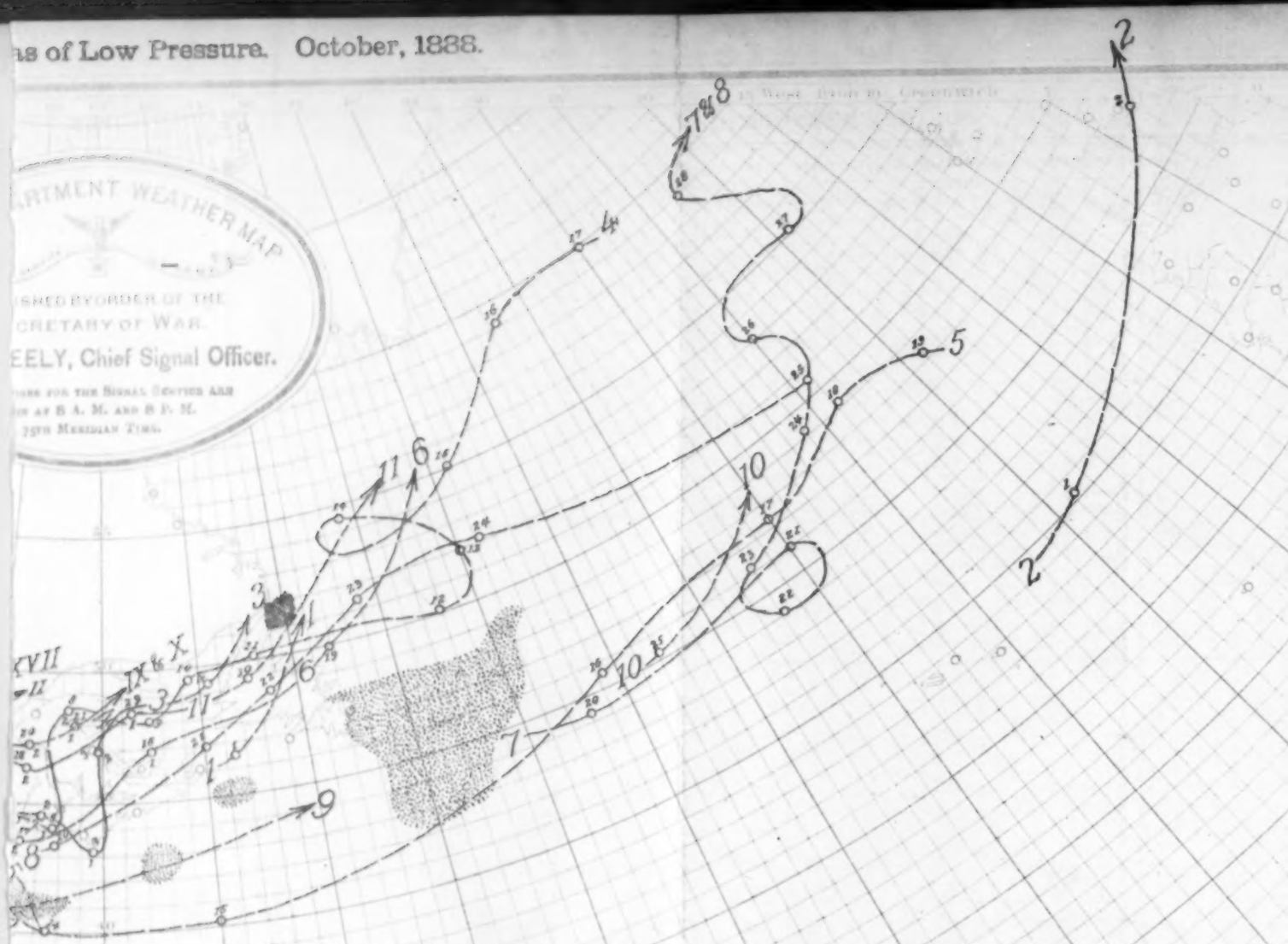
NOTES.

The Roman letters show number and order of areas of low pressure. The figures above the lines show the days of the month, those below (1 and 2) indicate, respectively, the 8 a. m. and 8 p. m., 75th meridian time, observations.

The dotted shading ( ) indicates fog belts.

The ruled shading ( ) indicates the position in which icebergs were observed.

West from Washington East from Washington


ARTMENT WEATHER MAP
ISHED BY ORDER OF THE
CRETARY OF WAR.
EELY, Chief Signal Officer.
TIONS FOR THE SIGNAL CENTRES ARE
DE AT 8 A. M. AND 8 P. M.
75TH MERIDIAN TIME.

Signal Office Lith.

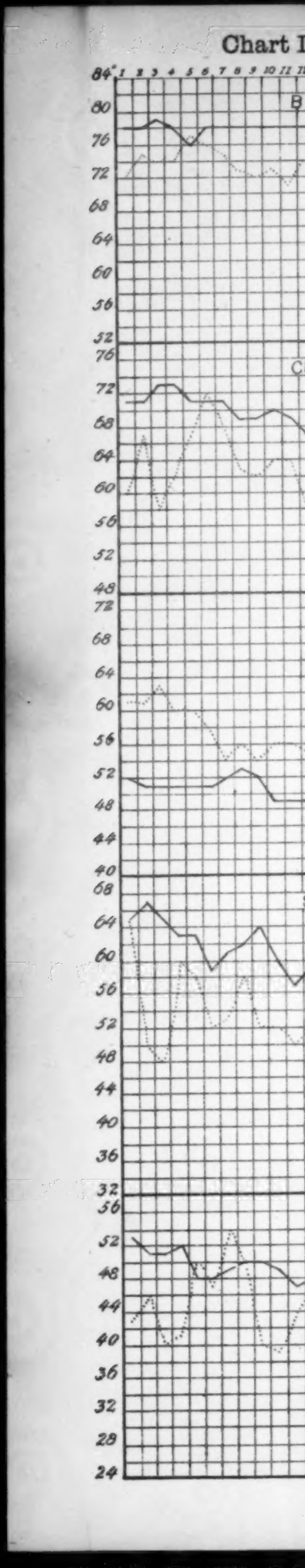
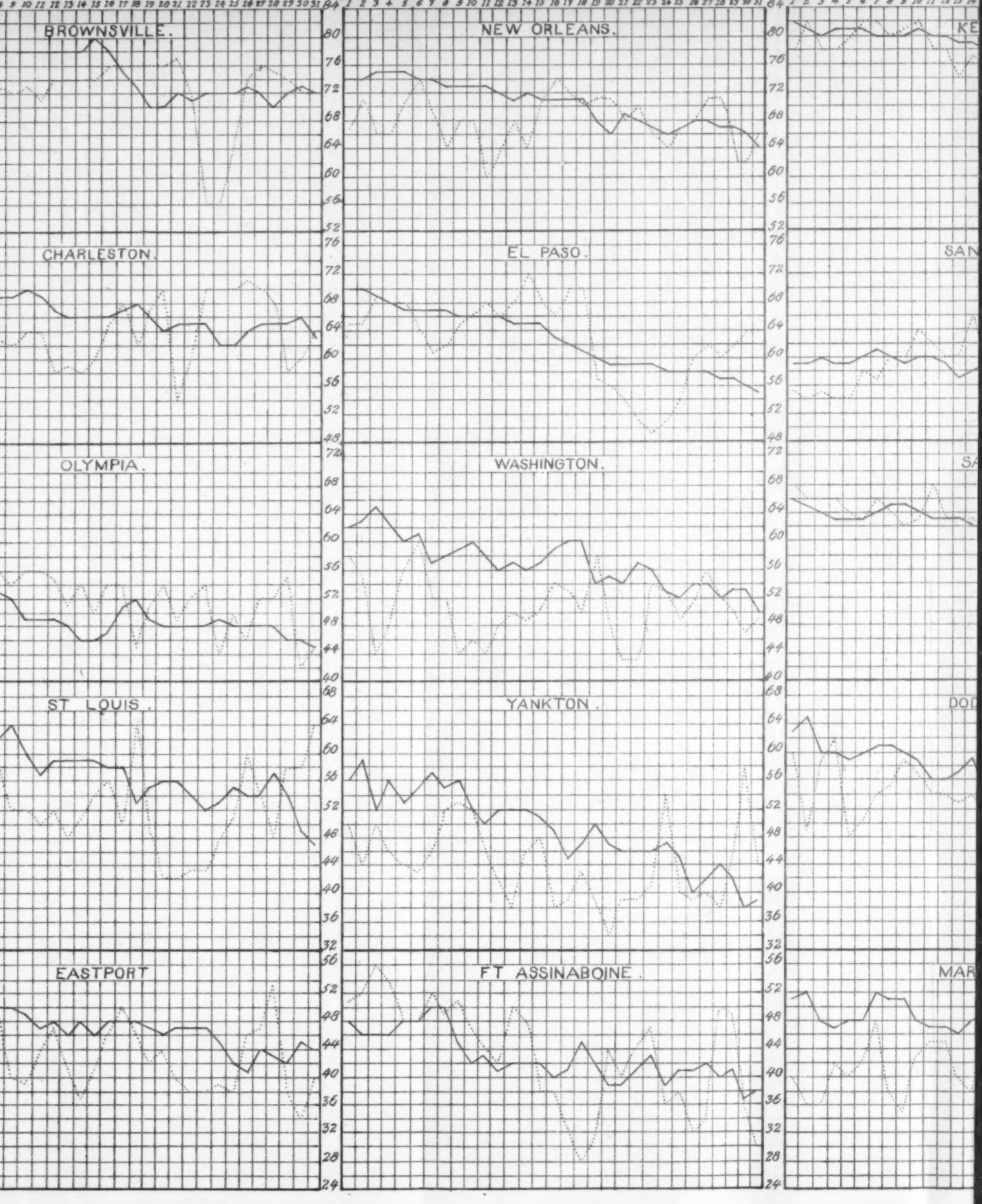
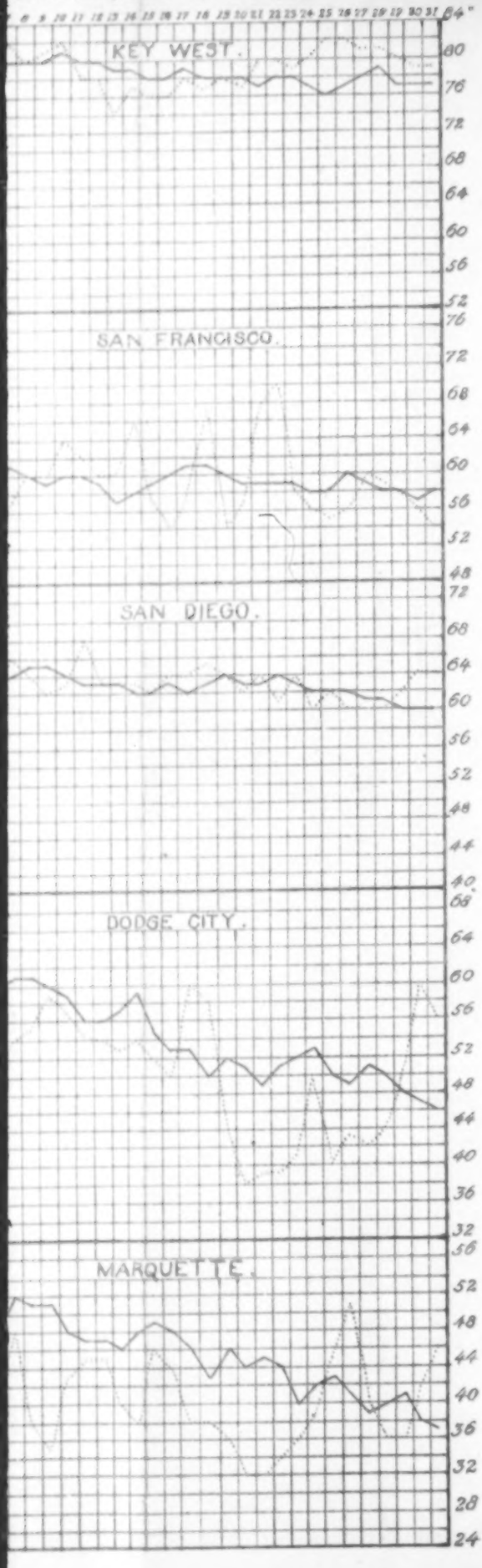


Chart I
84°
80
76
72
68
64
60
56
52
76
72
68
64
60
56
52
48
72
68
64
60
56
52
48
44
40
68
64
60
56
52
48
44
40
36
32
56
52
48
44
40
36
32
28
24

Chart III. Normal temperatures for a number of years (——). Mean temperatures for October, 1

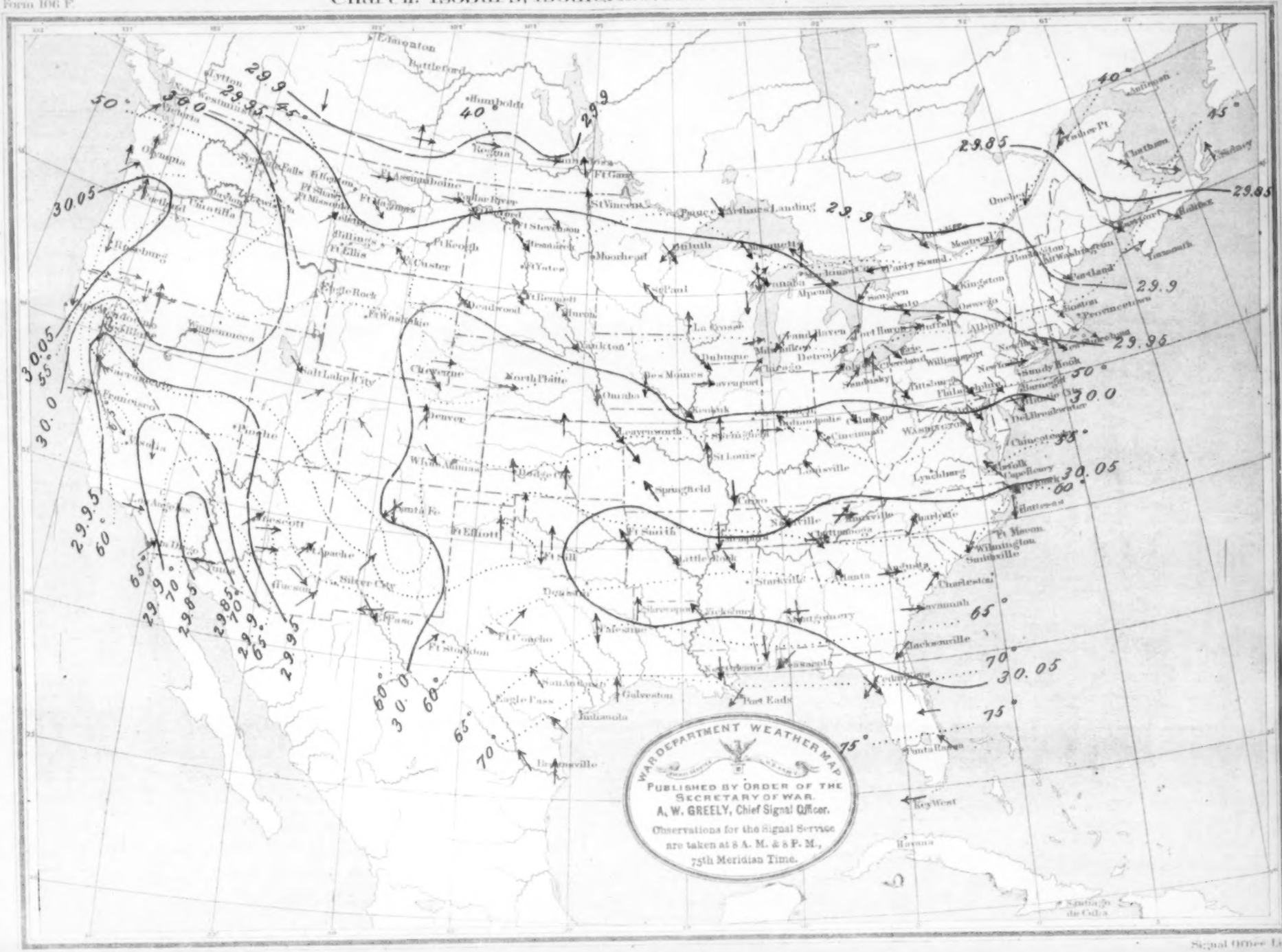


October, 1888 (.....).



Form 106 F.

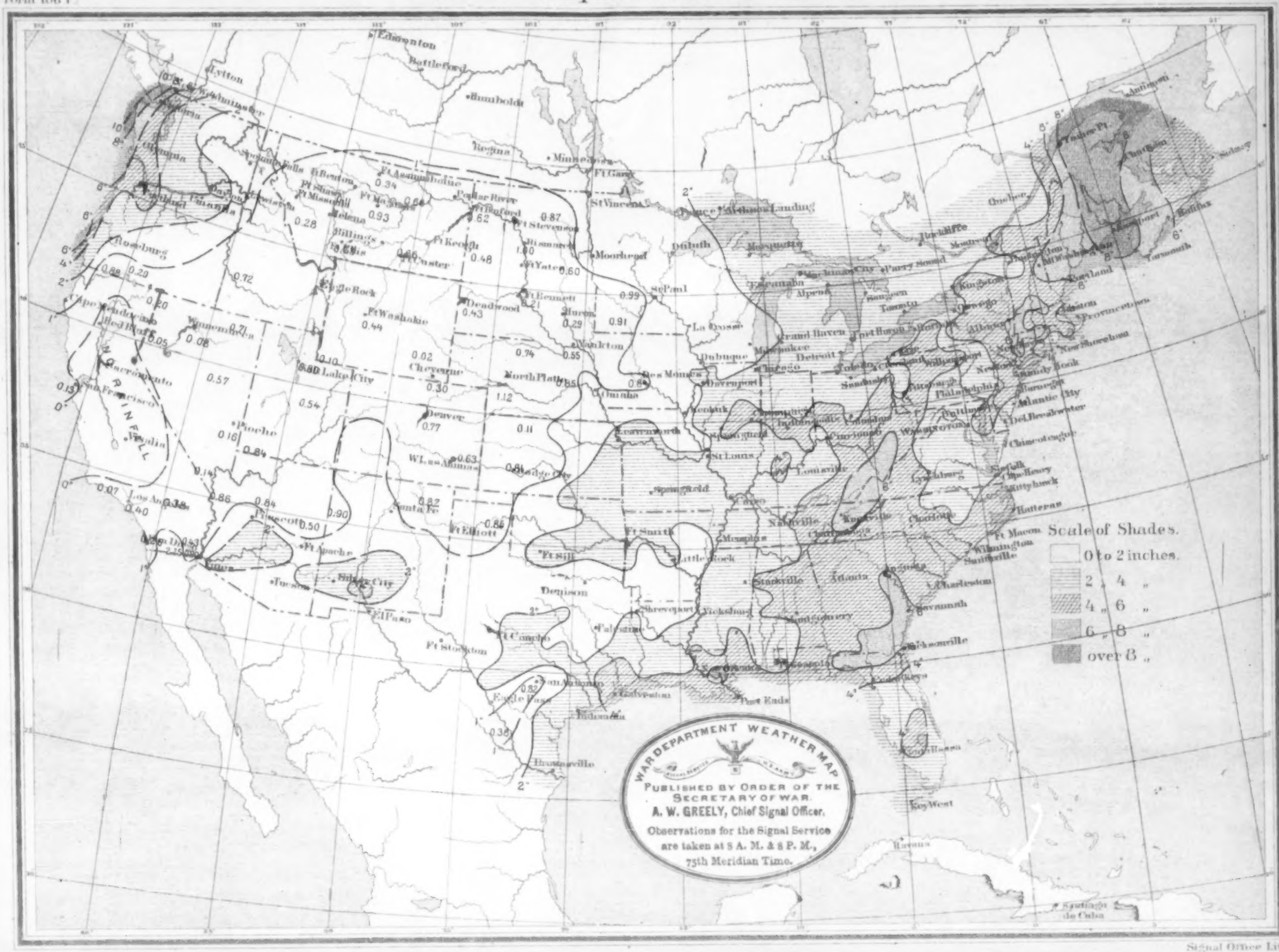
Chart II. Isobars, Isotherms, and Winds. October 1888.


WAR DEPARTMENT WEATHER MAP
PUBLISHED BY ORDER OF THE SECRETARY OF WAR.
A. W. GREELY, Chief Signal Officer.
Observations for the Signal Service are taken at 8 A. M. & 8 P. M., 75th Meridian Time.

Signal Office Lith

Form 106 F.

Chart IV. Precipitation, October, 1888.


Scale of Shades.
0 to 2 inches.
2 " 4 "
4 " 6 "
6 " 8 "
over 8 "
WAR DEPARTMENT WEATHER MAP
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A. W. GREELY, Chief Signal Officer.
Observations for the Signal Service are taken at 8 A. M. & 8 P. M., 75th Meridian Time.
RAINFALL

Signal Office Lith.

Form 106 P.

Chart V. Normal Precipitation for October, from 18 years observations, 1870 to 1888.

Scale of Shades.
0 to 2 inches
2 . 4 .
4 . 6 .
over 6 „
WAR DEPARTMENT WEATHER MAP
PUBLISHED BY ORDER OF THE SECRETARY OF WAR.
A. W. GREELY, Chief Signal Officer.
Observations for the Signal Service are taken at 8 A. M. & 8 P. M., 75th Meridian Time.

List of voluntary stations of the Signal Service, with their respective observers, who furnish meteorological reports for the Monthly Weather Review. Those marked with an asterisk (*) did not send reports in time to be used in Review for October, 1888.

Place of observation and observer.

ALABAMA.

Auburn, Alabama Weather Service.
Citronelle, J. G. Michael.
Livingston, J. W. A. Wright.
New Market, Dr. Geo. D. Norris.

ARIZONA.

Antelope Valley, Mrs. J. H. Hamilton.
Ash Canyon, John S. Robbins.
*Bangharts, ———
*Cedar Springs, R. E. Norton.
Flagstaff, Mrs. F. B. Jacobs.
Globe, J. H. Hamill.
Holbrook, David Rope.
*Huachuca, J. W. Stump.
*Lochiel, San Rafael Cattle Company.
Prescott Junction, W. W. Burnett.
*Showlow, C. E. Coolry.
Teviston, Miss Belle Tevis.
Tucson, Edward L. Wetmore.
Williams, J. T. Ryan.
*Willow Springs, F. A. Chamberlin.
Winslow, L. W. Roberts.

ARKANSAS.

Lead Hill, Silas C. Turnbo.
Little Rock, Arkansas Weather Service.

CALIFORNIA.

*Anderson, Dr. A. Fouch.
Banning, Welwood Murray.
Barstow, Geo. R. Gooding.
Georgetown, C. M. Fitzgerald.
Handford, Dr. W. H. Miller; N. E. Gribi.
*Hydesville, E. T. Foss.
Lewis Creek, John Touby.
Needles, John J. Clark.
Oakland, Dr. J. B. Trembley.
Oroville, Hiram Arents.
Sacramento, S. H. Gerrish.
Salinas, Dr. E. K. Abbott.
Santa Barbara, H. D. Vail.
*Santa Maria, L. E. Blochman.
Susanville, T. B. Sanders.
Willows, David Bentley.

COLORADO.

*Bennett, I. S. Putnam. [Service.
*Colorado Springs, Colorado Weather
Delta, J. A. Curtis.
Fort Collins, Prof. L. G. Carpenter.
Georgetown, W. A. Jayne, M. D.
Greeley, J. G. Reid.
Rocky Ford, F. Watrous.

CONNECTICUT.

Hartford, Wm. R. Matson.
New Hartford, Wm. Goodwin.
Southington, Luman Andrews.
Voluntown, Rev. E. Dewhurst.

DAKOTA.

Brookings, Prof. Lewis McLouth.
Davenport, J. W. Leech.
Gallatin, J. S. Pound.
Garden City, W. C. T. Newell.
Goddard, Mrs. M. F. Goddard.
Grand View, J. F. Angus.
*Highmore, W. R. McDowell.
Kimball, A. S. Stuver.
New England City, E. S. Clough.
*Richardton, Prof. A. Nordberg.
Webster, Arthur Betts.
Woonsocket, L. O. Libbey.

DELAWARE.

Newark, Prof. Geo. A. Harter.
Kirkwood, Wm. Carnagy.

DISTRICT OF COLUMBIA.

Kendall Green, Deaf & Dumb Institute.
Receiving Reservoir } Washington
Distributing Reservoir } Aqueduct.
Rock Creek Bridge }

FLORIDA.

Altamonte Springs, E. P. Tebeau.
Alva, Chas. E. Robins.
Archer, Dr. J. C. Neal.
Fort Meade, A. H. Adams.
Homeland, J. S. Wade.
Manatee, Mrs. Mary W. Broberg.
Merritt's Island, Rev. J. H. White.
Tallahassee, Rev. Dr. W. H. Carter.

GEORGIA.

Andersonville, H. W. Bryant.
*Athens, Prof. L. H. Charbonnier.
Duck, A. L. Gillespie.
Forsyth, Thos. G. Scott.
Hephzibah, R. L. Rhodes.
Marietta, G. S. Owen.
Milledgeville, S. A. Cook.
Quitman, J. L. Cutler.
*Thomasville, C. S. Boudurant.

Place of observation and observer.

IDAHO.

Lewiston, Robert Schleicher.

ILLINOIS.

Charleston, J. B. Dazey.
Collinsville, Dr. J. L. R. Wadsworth.
Jacksonville, P. J. Hasenstab.
Mattoon, Wm. Dozier.
Mount Morris, Wm. Feary.
Oswego, John S. Seely.
Palestine, John E. Templeton.
Pekin, Rev. J. E. Terborg.
Peoria, Dr. Fred. Brendle.
Philo, H. A. Burr.
Riley, John W. James.
Rockford, T. D. Robertson.
Sandwich, Dr. N. E. Ballou.
South Evanston, Dr. M. D. Ewell.
Springfield, Illinois Weather Service.
Sycamore, Roswell Dow.
Windsor, A. H. Hatch.

INDIANA.

Butlerville, C. F. Hole.
*Connersville, Robt. Hessler.
Jeffersonville, J. C. Loomis.
Laconia, Lafe Crozier.
La Fayette, Indiana Weather Service.
*Logansport, Thos. B. Helm.
Mauzy, Elwood Kirkwood.
Salem, J. W. May.
*Scalesville, Urias Wilson.
*Sunman, B. F. Ferris.
*Vevay, Prof. Chas. Boerner.

INDIAN TERRITORY.

*Caddo Creek, P. Leming, M. D.

IOWA.

Amana, Conrad Schadt.
Ames, J. Rush Lincoln.
Bancroft, H. N. Renfrew.
Cedar Rapids, H. D. Olds.
Clarinda, A. S. Van Sandt.
Clinton, Luke Roberts.
Cresco, Gregory Marshall.
Cromwell, Harry C. Harrison.
Denmark, G. B. Brackett.
Des Moines, Adolphus Voegeli.
Dysart, Jos. Dysart.
Elkader, J. N. Hamilton.
Fayette, Upper Iowa University.
Fort Madison, Miss L. A. McCready.
Glenwood, Seth Dean.
Glenwood, A. Schappel.
Grinnell, Prof. S. J. Buck.
Hampton, E. C. Grenelle.
Humboldt, Miss. Florence Prouty.
Independence, Emil F. Wülfke.
Iowa City, Prof. A. A. Veblen.
Iowa City, Iowa Weather Service.
Logan, Mrs. M. B. Stern.
Manson, W. L. Thompson.
Maquoketa, A. B. Bowers.
Monticello, H. D. Smith.
Mount Pleasant, Prof. Max E. Witte.
Mount Vernon, Prof. Alonzo Collin.
Muscatine, J. P. Walton.
Osage, G. D. Pettingill.
Osceola, F. M. Kyte.
Oskaloosa, Joseph Boyd
Oskaloosa, O. H. Avey.
Sac City, Dr. Caleb Brown.
Smithland, Dr. Chas. W. Rice.
Vinton, T. F. McCune.
Washington, Wm. A. Cook.
Wesley, Wm. Ward.

KANSAS.

Allison, John J. Cass.
Bendena, G. Campbell.
Cunningham, E. Shaw.
Elk Falls, Dr. A. C. Williams.
Emporia, Prof. J. H. Dinsmore, Jr.
Englewood, C. D. Perry.
Globe, Wm. Featherston.
Havensville, L. W. Dennen.
Independence, J. M. Altaffer.
La Harpe, Isaac S. Coe.
Lawrence, Prof. F. H. Snow.
Lebo, C. W. Burnet.
Leoti, L. C. Vickrey.
*Manhattan, C. P. Blachley.
*Manhattan, F. J. Rogers.
Morse, R. P. Edgington.
Salina, J. H. Gibson.
Santa Fe, Geo. W. Ball.
Sedan, J. W. Goodell.
Topeka, Kansas Weather Service.
Tribune, S. B. Jackson.

Place of observation and observer.

KANSAS—*Continued.*

Wakefield, Wm. P. Cochran.
*Wellington, John H. Wolfe.
*Wilson, Miss Lizzie Dolphin.
Yates Centre, F. R. Gray.

KENTUCKY.

Bowling Green, M. H. Crump.
*Carlisle, W. H. Fritts.
*Elkin, Chas. Ogden.
Frankfort, E. C. Went.
Louisville, Kentucky Weather Service.
*Millersburgh, C. Pope.
South Fork, A. B. Gilbert.

LOUISIANA.

Grand Coteau, Rev. C. M. Widman.
Liberty Hill, E. A. Crawford.
*Luling, F. M. Rogers.
New Orleans, Louisiana Weather Service.

MAINE.

Bar Harbor, Joseph Wood.
Cornish, Silas West.
Gardiner, Henry Richards.
Kent's Hill, W. C. Strong.
Orono, Prof. M. C. Fernald.

MARYLAND.

Barren Creek Sp'gs, Albert E. Acworth
Cumberland, E. T. Shriver.
*Fallston, Prof. G. G. Curtis.
Gaithersburgh, John T. De Sellum.
Galena, Henry Parr.
Gambrill's, J. E. Moque.
Great Falls, Washington Aqueduct.
Jewell, Jos. Plummer.
McDonogh, McDonogh Institute.
M't St. Mary's, M't St. Mary's College.
Woodstock, Woodstock College.

MASSACHUSETTS.

Amherst, Miss S. C. Snell.
Amherst, Massachusetts Agricultural Experimental Station.
Blue Hill, Rev. A. K. Teele.
Blue Hill Observatory, A. L. Rotch.
Cambridge, Harvard College Obs'y.
Deerfield, Rev. A. Hazen.
Dudley, Conant Observatory.
Fall River, C. V. S. Remington.
Heath, B. B. Cutler.
New Bedford, Thomas R. Rodman.
Newburyport, F. V. Pike.
Provincetown, John R. Smith.
Royalston, Miss Lizzie W. Chase.
Somerset, Elisha Slade.
Taunton, E. U. Jones, M. D.
Westborough, G. S. Newcomb.
*Williamstown, Williams College Obs.
*Worcester, J. B. Hall.

MICHIGAN.

Benton Harbor, A. J. McCave.
Birmingham, S. Alexander.
Harrisville, Dr. D. W. Mitchell.
Hudson, Major A. H. Boies.
Kalamazoo, W. A. Black.
Lansing, Dr. H. B. Baker.
Lansing, Michigan Weather Service.
Marshall, W. T. Drake.
*Mio, J. Randall.
Mottville, J. A. Hartzler.
Thornville, John S. Caulkins.
Traverse City, S. E. Wait.
Ypsilanti, J. C. Beemis.

MINNESOTA.

*Argyle, J. J. Stone.
Le Sueur, L. B. Davis.
Minneapolis, Wm. Cheney.
Northfield, Minnesota Weather Service.

MISSISSIPPI.

Biloxi, Dr. R. G. Hinsdale.
*Jackson, W. J. Brown, Jr.
Palo Alto, W. H. Hill.
University, Mississippi Weather Service.

MISSOURI.

Conception, Rev. M. Eckstein.
Excelsior Springs, A. Reinisch.
Fayette, Prof. T. Berry Smith.
Frankford, W. W. Vermillion.
Grand Pass, E. R. Graham.
Lakenan, C. Ayres.
New Frankfort, G. W. Hawkins.
*Ozark, J. J. Brown.
Pierce City, J. J. Spilman.
Princeton, Wm. Hirons.
St. Louis, Missouri Weather Service.

MONTANA.

Virginia City, Eugene Stark.

Place of observation and observer.

NEBRASKA.

Crete, Nebraska Weather Service.
Culbertson, G. B. Carrington.
David City, John R. Townsend.
De Soto, Chas. Seltz.
Fairbury, Dr. I. Humphrey.
Falls City, A. B. Newkirk.
Fremont, Isaac E. Heaton.
Genoa, Geo. S. Truman.
Hay Springs, Wm. Waterman.
*Kimball, Wm. G. Barton.
*Lincoln, University of Nebraska.
Marquette, John Ellis,
Syracuse, P. W. Risser.
Tecumseh, W. L. Dunlap.
Weeping Water, G. Treat.

NEVADA.

Carson City, Chas. W. Friend.
Carson City, Nevada Weather Service.

NEW HAMPSHIRE.

Antrim, Frank W. Palmer.
Berlin Mills, O. A. Bridges.
Concord, W. L. Foster.
Nashua, Chas. H. Webster.
*Ashland,
Belmont,
Bristol,
Lake Village,
Weir's Bridge,
Wolfeborough, } Lake Winipiseogee Cotton and Woollen Manufacturing Co.
Shaker Village, N. A. Briggs.

NEW JERSEY.

Beverly, C. F. Richardson.
Clayton, W. T. Wilson.
Egg Harbor City, H. Y. Postma.
Moorestown, Thos. J. Beans. [Service.
New Brunswick, New Jersey Weather
Readington, John Fleming.
South Orange, Dr. W. J. Chandler.
*Vineland, Dr. O. H. Adams.

NEW MEXICO.

Coolidge, B. S. Mullin.
Gallinas Spring, J. E. Whitmore.
Las Vegas, F. W. Chatfield.

NEW YORK.

Ardenia, Richard B. Arden.
Auburn, Geo. Casey.
Boyd's Corners, Thomas Manning.
Cooperstown, G. Pomeroy Keese.
Eden, W. P. Hunt.
Factoryville, T. P. Yates.
Friendship, Jesse D. Rogers.
Geneva, Mrs. N. S. Yates.
Hess Road Station, C. H. Spaulding.
Humphrey, Chas. E. Whitney.
Ilion, G. A. Trowbridge.
Ithaca, Cornell University.
Ithaca, New York Weather Service.
Le Roy, Prof. F. M. Comstock.
Lyon, Dr. M. A. Veeder.
Middleburg, F. K. Straub.
*New York, Central Park Observatory.
Nineveh, W. J. Barnet.
*North Volney, J. M. Patrick.
Palmyra, L. D. Cummings.
Pendleton, W. D. Lovell.
Penn Yan, Geo. R. Young.
Rose, George Smart.
Savona, M. S. Collier, M. D.
Setauket, Selah B. Strong.
Somerset, J. W. Thurber.
South Canisteo, J. W. Wilson.
Utica, Thomas Birt.
Vermillion, E. B. Bartlett.
Waddington, Jos. Graves.
White Plains, Prof. O. R. Willis.

NORTH CAROLINA.

Chapel Hill, Prof. J. W. Gore.
Hot Springs, Dr. W. F. Ross.
Lenoir, Dr. R. L. Beall.
*Raleigh, Thos. C. Harris.
Raleigh, North Carolina Weather Service.
Statesville, W. A. Eliason.
*Tarborough, E. V. Zreller.
Weldon, T. A. Clark.

OHIO.

Bellevue, Wm. Sheffield.
Cleveland, G. A. Hyde.
College Hill, John W. Hammitt.
Collinwood, Wm. Smeed.
Columbus, Ohio Weather Service.
Demos, B. B. Ault.
Elyria, C. W. Goodspeed.
Garrettsville, S. M. Luther.
Gracey, H. M. Scott.

List of voluntary stations of the Signal Service, with their respective observers, who furnish meteorological reports for the Monthly Weather Review—Cont'd.

Place of observation and observer.
OHIO—*Continued.*
Jacksonborough, Dr. J. B. Owsley.
Lordstown, W. S. Dean.
Napoleon, Dr. T. C. Hunter.
New Athens, T. M. Sewell.
North Lewisburgh, H. D. Gower.
Portsmouth, Dr. D. B. Cotton.
Ruggles, Peter Bowman.
Tiffin, Rev. T. H. Sonedecker.
Wauseon, Thos. Mikesell.
Westerville, Prof. John Haywood.
West Milton, Luke S. Motte.
Yellow Springs, Chas. W. Ried.
OREGON.
Albany, John Briggs.
Bandon, Geo. Bennett.
East Portland, Dr. Geo. Wigg.
Eola, Thos. Pearce.
*La Grande, J. K. Romig.
McMinnville, Prof. W. J. Crawford.
Mount Angel, Rev. F. Barnabas Held.
Yaquina L. H., Dr. John G. Jessup.
PENNSYLVANIA.
Altoona, Chas. B. Dudley, M. D.
Catawissa, Robt. M. Graham.
Clarion, Prof. C. M. Thomas.
Corry, Wm. Loveland.
*Drifton, H. D. Miller.
Dyberry, Theo. Day.
Easton, Dr. J. W. Moore.
Franklin, Joseph Bell.
Germantown, Thos. Meehan.
Grampian Hills, Nathan Moore.
Haverford, Prof. F. P. Leavenworth.
*Johnstown, E. C. Lorentz.
Meadville, David Logan. [Service.
Philadelphia, Pennsylvania Weather

Place of observation and observer.
PENNSYLVANIA—*Continued.*
Philipsburgh, G. F. Dunkle.
Quakertown, J. L. Heacock.
Reading, C. M. Dechant.
Salem Corners, T. B. Orchard, M. D.
State College, Agricultural Experimental Station.
Troy, M. Gustin.
Wellsborough, Hiram D. Deming.
West Chester, Dr. Jesse C. Green.
*Westtown, Wm. F. Wickersham.
SOUTH CAROLINA.
Aiken, Dr. W. H. Geddings.
Cedar Springs, J. T. Bayerly. [vice.
Columbia, South Carolina Weather Ser-
Kirkwood, Colin Macrae.
Statesburgh, Dr. W. W. Anderson.
TENNESSEE.
Ashwood, Rev. C. F., Williams.
Austin, P. B. Calhoun.
Milan, Dr. M. D. L. Jordan.
Nashville, State Board of Health.
Riddleton, F. K. Fergusson.
TEXAS.
Austin, Oscar Samostz.
Bear Creek Ranche, W. H. Potter.
Cedar Hill, J. P. Borry.
Cleburne, Dr. T. C. Osborn.
College Station, Prof. J. H. Kinealy.
*Colorado, Fred R. Blount.
*Comanche, E. N. Wiesendanger.
Corsicana, W. H. Hamilton.
Decatur, H. D. Donald.
Gallinas, Lum Woodruff.
Galveston, Texas Weather Service.
Granbury, E. H. Snider.
Lampasas, Dr. C. M. Ramsdell.

Place of observation and observer.
TEXAS—*Continued.*
Mesquite, Miss G. Lackey.
Mexia, Chas. F. Mercer.
New Ulm, C. Runge.
Silver Falls, C. M. Tilford.
VERMONT.
Brattleborough, W. H. Childs.
Burlington, W. B. Gates.
Coventry, W. H. Tibbetts.
East Berkshire, J. H. Mears.
Lunenburgh, Dr. Hiram A. Cutting.
Manchester, Rev. E. P. Wild.
Middlebury, S. Holton.
Newport, M. B. Trasher.
Saint Johnsbury, F. Fairbanks.
Strafford, H. F. J. Scribner.
VIRGINIA.
Bird's Nest, C. R. Moore.
Christiansburgh, H. D. Walters.
Dale Enterprise, J. L. Heatwole.
Marion, A. T. Lincoln.
*Petersburgh, Jas. M. Colson, Jr.
*Rappahannock, W. H. Ireland.
Spottsville, B. W. Jones.
Summit, J. R. Sim.
University of Va., James Wearmouth.
*Variety Mills, J. H. Micklem.
Wytheville, Howard Shriver.
WASHINGTON TERRITORY.
Blakeley, R. M. Hoskinson.
Tacoma, E. N. Fuller.
Vashon, Mrs. C. B. Carpenter.
WEST VIRGINIA.
*Clarksburgh, R. T. Lowndes.
Hartmonsville, W. C. Tobb.
Helvetia, Dr. C. T. Stucky.
Middlebrook, S. F. H. Hewit.

Place of observation and observer.
WEST VIRGINIA—*Continued.*
Parkersburgh, T. G. Field.
Rockport, R. D. J. Echols.
Tyler Creek, F. M. Swann.
White Sulpher Springs, T. Surber.
WISCONSIN.
*Beloit, Beloit College Observatory.
Cadiz, B. C. Curtis.
Delavan, George L. Collie.
Deuster, G. H. Kruschke.
*Embarrass, J. E. Breed.
Fond du Lac, J. C. Wedge.
Fredonia, B. H. Meyer.
*Lancaster, Edward Pollock.
Lincoln, A. J. Loose.
Madison, Washburn Observatory.
Manitowoc, Miss Clasina Lüps.
Oshkosh, Prof. W. N. Mumper.
Waucousta, G. H. Yapp.
Weston, R. R. Wilkinson.
FOREIGN.
*Burnside, S. A., Dr. C. J. Hering.
Grand Turk, W. Indies, Geo. I. Gibbs.
Guanajuato, Mexico, Met'l Obs'y.
Hamilton, Bermuda, General Russell Hastings.
Killisnoo, Alaska, Jos. Zuboff.
Leon, Mexico, Prof. M. Leal.
*Mazatlan, Mexico, Leon P. Acosta.
Mexico, Mexico, Meteorological Obs'y.
*Monterey, Mexico, Dr. Wm. De Ryee.
Montreal, Quebec, C. H. McLeod.
New Westminster, B.C., Capt. A. Peele.
Port au Prince, Hayti, Prof. I. Scherer.
*Pueblo, Mexico, Catholic Institute.
*Zacatecas, Mexico, Jose A. y Borrilla.

Military posts from which meteorological reports were received, through the Surgeon General of the Army, in time to be used in the preparation of the Monthly Weather Review for October, 1888.

Alabama.	*California*—Cont'd.	*Florida.*	*Maryland.*	*Nebraska.*	*New York*—Cont'd.	*Virginia.*
Mount Vernon B'ks.	Presidio of San F.	Saint Francis B'ks.	McHenry, Fort.	Niobrara, Fort.	Niagara, Fort.	Monroe, Fort.
Arizona.	*Colorado.*	*Idaho.*	*Michigan.*	Robinson, Fort.	Plattsburgh Barracks.	*Washington Ter.*
Huachuca, Fort.	Lewis, Fort.	Boisé Barracks.	Brady, Fort.	Sidney, Fort.	Wadsworth, Fort.	Spokane, Fort.
McDowell, Fort.	Lyons, Fort.	Sherman, Fort.	Mackinac, Fort.	*Nevada.*	West Point.	Townsend, Fort.
Mojave, Fort.	*Dakota.*	*Indian Territory.*	*Minnesota.*	McDermit, Fort.	*Oregon.*	Vancouver, Fort.
Whipple Barracks.	A. Lincoln, Fort.	Gibson, Fort.	Snelling, Fort.	*New Mexico.*	Klamath, Fort.	Walla Walla, Fort.
Arkansas.	Bennett, Fort.	Reno, Fort.	*Montana.*	Bayard, Fort.	*Texas.*	*Wyoming.*
Hot Springs.	Meade, Fort.	Supply, Fort.	Assinaboine, Fort.	Selden, Fort.	Clark, Fort.	Bridger, Fort.
California.	Pembina, Fort.	*Kansas.*	Custer, Fort.	Union, Fort.	Concho, Fort.	D. A. Russell, Fort.
Angel Island.	Randall, Fort.	Hays, Fort.	Keogh, Fort.	Wingate, Fort.	Davis, Fort.	Laramie, Fort.
Alcatraz Island.	Sisseton, Fort.	Leavenworth, Fort.	Maginnis, Fort.	*New York.*	Elliott, Fort.	McKinney, Fort.
Benecia Barracks.	Sully, Fort.	Riley, Fort.	Missoula, Fort.	Columbus, Fort.	Hancock, Fort.	Pilot Butte, Camp.
Bidwell, Fort.	Totten, Fort.	*Maine.*	*Shaw, Fort.	David's Island.	McIntosh, Fort.	Sheridan, Camp.
Gaston, Fort.	Yates, Fort.	Preble, Fort.		Hamilton, Fort.	Ringgold, Fort.	Washakie, Fort.
Mason, Fort.				Madison Barracks.		

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